



Självständigt arbete (15 hp)

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<u>Acquiring Deterrence - Defence Procurements' Role in Deterrence</u>		
<p>A major Norwegian defence procurement project takes decades from project initiation to the desired military capability is delivered and has reached full operational capability. The Norwegian Armed Forces' primary mission is to maintain a credible deterrence and prevent armed conflicts arising, meaning that the capability acquired through military procurement projects must play into future general deterrence. Do Norway's strategic military capability procurement projects contribute to a credible and capable deterrence?</p> <p>The purpose of this study is to gain a deeper understanding of the deterrence potential of two chosen Norwegian military procurement projects of strategic importance. The capabilities studied are the acquisition of the US fifth generation fighter, F-35 Lightning II and the 212CD submarine to be designed and built by Germany. The two projects have a combined estimated investment cost of 113 billion NOK.</p> <p>Deterrence is a large area in social science and the discipline of War Studies. This study applies a deterrence theory lens, primarily based on the conclusion in Zagare's and Kilgour's perfect deterrence theory regarding the importance of capable and credible threats, operationalised through Dalsjö's five dimensions of threshold defence.</p> <p>The analysis identifies a clear credibility issue with one of the projects and the paradox that cost saving decisions intended to ensure operational availability and increase credibility also make the capability more vulnerable and less credible due to lack of redundancy.</p> <p>Key words:</p> <p>Deterrence, Conventional Deterrence, Perfect Deterrence, Threshold Defence, Defence Procurement, Military Capability, F-35, 212CD</p>		

Acquiring Deterrence

Defence Procurements' Role in Deterrence

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1. Introduction

Norwegian national defence relies heavily on international support through NATO article 5, however until such support can be gained and military capabilities are established on Norwegian soil, national defences are founded on the ability of the Norwegian Armed Forces to create a conventional military deterrence.¹ However, the word deterrence has, until late, seldom been used in any official discourse regarding defence and military capabilities. In Norway and Scandinavia this deterrence is also known as threshold defence, and according to Robert Dalsjö, the threshold consists of five intertwined dimensions: deterrence, defence/obstacle, marker, alarm-bell, and trip-wire.² This threshold defence is intended to inflict enough damage to deter a potential aggressor from attacking in the first place and second trigger a military response from NATO, subsequently holding or delaying the front long enough for international military forces to arrive. There is a growing concern in Norway among politicians and scholars that NATO article 5 guarantee is less valid in today's political climate.³ The only realistic potential aggressive actor with a close proximity and military force large enough to conduct a major military operation towards Norwegian territory is Russia. The Norwegian Government has a tradition of balancing their posture towards Russia between reassurance, with self-enforced restrictions on Allied exercises in Finnmark and deterrence (pre-positioning of US military equipment in Trøndelag). The idea of a reliable threshold defence has, at least in theory, determined what military capabilities Norway has invested in and to what extent.⁴

With this backdrop, as well as the Norwegian commitment to spend 20% of the defence budget on investments,⁵ the Norwegian Parliament, has approved two major military procurement projects, the ongoing acquisition of the F-35 fighter jet and the imminent acquisition of the new 212CD submarine. This can be interpreted as a desire to strengthen conventional deterrence.

1.1 Framing the problem

A typical major defence procurement lasts a minimum of 10 to 15 years from the investment approval of parliament until the last unit is delivered and has reached full operational capability. Before the project is presented to the parliament for approval there is an extensive planning period, usually spanning several years, resulting in the combined initiating, planning and acquiring phases of a project easy stretching over 20 years. This means that the capability acquired through military procurement projects must play into future general deterrence, hence it's evident that future capabilities years from completion will not play a major role in immediate deterrence during a crisis. Though, such projects can of course play a part in the initiation of a crisis, where a challenging state interpret such projects, an example is NATO's

¹ Norwegian Ministry of Defence, *Prop. 151.S (2015-2016) Kampkraft og bærekraft–Langtidsplan for forsvarssektoren*, p 5-6

² Dalsjö, R. (2017) Five dimensions of a threshold defence, *FOI Report no. FOI-R-4458--SE*

³ Beadle A. W. and Diesen S. (2015) Globale trender mot 2040 – implikasjoner for Forsvarets rolle og relevans, *FFI-report 2015/01452*, p 3-4

⁴ Beadle and Diesen, *Globale trender*, p 139,141

⁵ Norwegian MOD, *Prop. 151.S*, p 31

ballistic missile defence,⁶ as a military build-up and an altering of the military balance and status quo. Even though Norwegian procurement projects are decided by parliament based on governmental propositions, they're initiated on military recommendation, the armed forces conduct preliminary planning and a capability's requirements are determined by the military service that will operate the capability.

How can we know if these projects will be capable of not only creating the desired military capability but also creating appropriate deterrence? Predicting the future is difficult in the short term, harder in the medium term and very difficult in the long term, but what we can do is turn to science and find support there. Deterrence theory is the major field in social science that would be natural to turn to, to test if a major defence procurement serves the military purpose of deterrence.

1.1.1 Research gap

After the invention of the atomic bomb in 1945 and the start of the nuclear arms race, a huge amount of research regarding strategic nuclear deterrence has been conducted. Its impact on modern history is evident if we look at the Cold War era and according to Ted Hopf, deterrence theory is the single most successful social science product to influence US foreign policy.⁷ Fewer studies have been conducted regarding conventional non-nuclear deterrence, but it is still a rich field to harvest from. The literature on the small state deterring a super power is even narrower in terms of quality of available sources, though there is an ongoing debate among researchers on the impact of conventional deterrence. In Norway, there is a current discussion regarding Norwegian military and political posture towards Russia, and if it is changing from reassurance to deterrence. A noted researcher and later Norwegian Defence Minister Johan Jørgen Holst wrote several books⁸ and articles⁹ regarding Norwegian approach to deterrence during the from the 1960s to the 1980s. In the recent years both Anders Kjølberg at FFI¹⁰ and Tormod Heier at Norwegian Defence University College (NDUC) have studied Norwegian Deterrence and published their findings.¹¹ Ståle Ulriksen at NDUC and NUPI¹² is another active researcher participating in the debate regarding Norwegian deterrence and security.¹³ No studies have been found with respect to how specific Norwegian defence acquisitions relate to deterrence and how the procurement of the F-35 and the 212CD contributes to it in creating a perceived credible and capable deterrence threat against an aggression of a super power.

⁶ Konyshv, Sergunin, Subbotin, (2016) The US ballistic missile defence policy in the Baltic and Nordic regions, *Baltic Region 2016;8(1)*, p 33-44

⁷ Hopf T., *Peripheral Vision, Deterrence Theory and American Foreign Policy in the Third World, 1965-1990*, (University of Michigan Press 1994), p vii

⁸ Holst, J. J. *Norsk sikkerhetspolitikk i strategisk perspektiv-bind 1 Analyse*, (Norsk utenrikspolitisk institutt. 1967)

⁹ Holst, J. J. (1966). Norsk sikkerhetspolitikk i strategisk perspektiv. *Internasjonal politikk*, 24(5), p 463-490 and Holst, J. J. (1982), Norwegian Security Policy for the 1980s, *Cooperation and Conflict*, Vol.17(4), p 207-236

¹⁰ FFI; Norwegian Military Research Institute

¹¹ Heier T. & Kjølberg A. (Red.), *Mellom fred og krig, Norsk militær krisehåndtering*. (Universitetsforlaget 2013) and *Norge og Russland, Sikkerhetspolitiske utfordringer i nordområdene*. (Universitetsforlaget AS 2015)

¹² NUPI; Norwegian Institute of International Affairs

¹³ Ulriksen S. (2015), En kommentar til Forsvarsjefens fagmilitære råd (1&2), *NUPI Policy Brief;2015-28*

1.2 Purpose and questions

This study falls into the research area on conventional/general deterrence and will focus on deterrence from the perspective of a small state's strategic non-nuclear military capabilities. The purpose of the study is to gain a deeper understanding of the deterrence potential of two chosen Norwegian military capability projects, the new fighter jets and the new submarines. The general research question is;

Do Norway's strategic military capability procurement projects contribute to a credible and capable deterrence?

1.2.1 Specific Research Questions

1. Do the projects lead to sufficiently capable military weapon systems able to inflict serious harm on an attacker?
2. How do the procured capabilities contribute offensively and defensively?
3. Do the projects show defence dedication?
4. How will the procured capabilities strengthen credibility in national commitment and trigger international military support in case of deterrence failure?

1.3 Sources, Data and Delimitations

Deterrence is a large area in social science and often falls within the discipline of War Studies, though most such studies relate to nuclear deterrence and not so much to conventional deterrence, there are numerous sources to choose from. The main sources for my work are renowned scientists in their field and well cited in relevant academic work. The section on classical deterrence is primarily based on Lawrence Freedman's book *Deterrence*¹⁴ and Patrick M. Morgan's *Deterrence Now*¹⁵. Professor of War Studies John Mearsheimer's book *Conventional Deterrence*¹⁶ from 1983 lays the foundation for the sub-chapter on conventional deterrence. Perfect deterrence theory (PDT) is a theory created by Frank Zagare and D. Marc Kilgour and published in their book *Perfect Deterrence*¹⁷. The use of threshold defence for the operationalising of the study is mainly based on Dalsjö's Swedish Defence Research Agency's report/article¹⁸ on threshold defence.

To conduct my textual analysis of Norwegian defence procurements, I have only used open sources and no classified data has been utilised. Even though classified data is referenced in some of documents and reports, I have not searched out these classified references with the purpose of keeping this work unclassified and fully available to the public. My main source for the case analysis has been the Norwegian Government official documents including propositions to the parliament (white papers), consultancies and expert's reports, procurement solutions documents, briefings and presentations. Another primary source has been the official webpages of the appointed main contractor for each of the procurement projects.

¹⁴ Freedman L., *Deterrence*, (Polity Press 2004)

¹⁵ Morgan P. M, *Deterrence Now*, (Cambridge University Press, 2003)

¹⁶ Mearsheimer John J., *Conventional Deterrence*, (Cornell University Press, 2017, Kindle)

¹⁷ Zagare F. C. and Kilgour D. M. *Perfect Deterrence* (Cambridge University Press, 2000)

¹⁸ Dalsjö, Five dimensions

Due to the scope and formal limitations of this study as a dissertation, my Norwegian defence procurement case has been limited to only include two acquisition projects: F-35 and 212CD, representing two of the five services. The focus will lay on air and sea dimension of deterrence, covering land and special forces only where the capabilities have a direct impact. The cyber dimension of deterrence will not be covered due to security classification of data related to command and control.

Imminent deterrence relates to crisis situations and will not be covered in this paper as the case in this study is defence procurements and they span several years.

Where properties/capabilities of 212CD are unknown/classified, a small increment of the 212A class' properties/capability is assumed in accordance with Project 6346 philosophy of evolutionary design where most improvements will rely on the last version of mature technology and research and development will be kept on a minimum.

1.4 Disposition

I will firstly describe deterrence theory in general, where three areas within deterrence theory will be portrayed: classic, conventional and PDT. Secondly, I will explain threshold defence, it's five dimensions and argue the case that threshold defence represents capable and credible in PDT. Then build on that argument to present my applied theory/hypothesis on my Norwegian procurement case consisting of two acquisition projects: F-35 and 212CD.

In the method chapter, I will explain the chosen textual analysis method which will be operationalised through identifying the answers to my specific research questions in the selected texts thus compiling my case study. My case consists of the F-35 and 212CD procurement projects. Pending the answer derived from the texts I will determine how the two selected projects influence Norwegian deterrence. The more capable and credible threat the capability represents the more likely it contributes to successful deterrence. The relationship between the military capabilities and deterrence threats will be how capable the weapon system is and its compliance with the four additional dimensions of threshold defence. Each specific research question will end in a conclusion as to whether the weapon system has a positive or negative impact on capable and credible threats in the context of the particular question, ultimately to determine if it contributes to deterrence.

The analysis will be conducted in chapter 4 on my case, Norwegian Defence Procurement, and this study consists of two major military material acquisition projects, F-35 fighter aircrafts and 212CD submarines. I will split the analysis of my case into two identical parts, one for each project answering the specific research questions. At the end of the chapter these answers will be merged for each project to present the conclusions derived from the analysis.

In the last chapter I will perform a discussion of the analysis results and conclusions, with a critical view on the wider picture of Norwegian deterrence. This chapter will further express my own critical reflections, regarding both analytical conclusions and the study itself. At the end of the study I will present my recommendations for further related research.

2. Deterrence Theory

To deter is to discourage someone from doing something by instilling fear of the consequences. When we talk about deterrence in a military context the someone is usually a state and the something that is to be discouraged is a military attack. Basically, deterrence is the use of threats to maintain status quo. One state will then be classed as an aggressor or challenger wanting to achieve something through a military attack on another state, classed as the defender. Both states can view the other state as a challenger creating mutual deterrence. From the viewpoint of the defender, deterrence is successful if the status quo remains. Deterrence is a general phenomenon that is not limited to any particular time or space.¹⁹ Deterrence theory distinguishes itself from deterrence strategy which refers to a specific military posture and its ways to communicate it, while the theory concerns the underlying principles on which the strategies rest.²⁰ I will present three areas of deterrence theory, classical deterrence²¹, conventional deterrence and perfect deterrence²², but the focus will lay on the latter theory.

2.1 Classical Deterrence

Deterrence theory was developed during the Cold War and in the framework of the Cold War became a matter of any possible contributions to the preservation of the status quo.²³ One of the central contributors was Bernard Brodie, working for the RAND cooperation and the US Strategic Air Command.²⁴ Deterrence became a doctrine elevated to the status of a general theory of strategic relationships.²⁵ The doctrine was associated with continuity and the status quo, staying in the middle between appeasement and aggression and promoted caution.²⁶

Strategic deterrence is built upon the idea that an actor (defender) fears that another actor (aggressor) intends to act against the defender's interests and takes steps to persuade the aggressor not to do so by threatening to take disciplinary actions, the aggressor will be met with resistance if attacking and punished if the attack is successful.²⁷ The aggressor should understand that an attack on the defender will fail, either firstly because of the defender's resistance or ultimately because of retaliation from the defender that will out-weight any prospective gains.²⁸ The disciplinary actions of the defender in strategic deterrence take the form of conditional threats. Freedman identifies four distinctions among the threats: "narrow and broad, extended and central, denial and punishment, immediate and general".²⁹ All are well used expressions within classical deterrence. Narrow deterrence means deterring a particular type of war or warfare, for example chemical, while broad deterrence means deterring all war.³⁰ Narrow deterrence is what we saw during the Arabian Spring when the

¹⁹ Quackenbush, S. (2010) Deterrence theory: Where do we stand? *Review of International Studies*, 37, p 741

²⁰ Morgan, *Deterrence Now*, p 8

²¹ Typical as presented in; Morgan, *Deterrence Now*

²² Zagare and Kilgour, *Perfect Deterrence*

²³ Freedman, *Deterrence*, p 14

²⁴ Kaplan, F., *The Wizards of Armageddon*, (Stanford University Press, 1983)

²⁵ Freedman, *Deterrence*, p 15

²⁶ *Ibid* p 25

²⁷ *Ibid* p 27

²⁸ *Ibid* p 27

²⁹ *Ibid* p 32

³⁰ *Ibid* p 32

international community were aiming at preventing the Syrian army from using chemical weapons but did little to stop the conflict itself. Extended deterrence is when an actor extends his threats to include disciplinary action towards an aggressor even if a third party is being attacked and not the actor itself, while central deterrence is to only deter an attack on oneself.³¹ Western Europe being under the protection of the US nuclear umbrella was an extended deterrence by the Americans towards the Soviet Union. Deterrence by denial is when a defender has a defence strong enough to withstand and defeat the invading army, punishment refers to the situation where if an aggressor attacks the costs would be unbearable even if initial successful.³² During the Cold War NATO built up significant conventional forces to be able to deny USSR a quick victory in Europe in addition to having nuclear forces to punish the Soviets if the invasion was successful. We have a state of immediate deterrence when one of the actor is seriously considering an attack and the other threatens to retaliate, a major international crisis has developed, as opposed to general deterrence which is the norm of maintaining a military force even though there might not be an imminent threat present.³³ The Cuban Missile Crisis is a well-studied example of immediate deterrence.³⁴ According to Patrick M. Morgan, the development of deterrence theory was driven by the thought that there was more or less a continuous crisis between East and West and an imminent attack was likely to happen leading scholars to focus on immediate deterrence.³⁵ However, Albert Wohlstetter, suggested already in his 1957 article *The Delicate Balance of Terror*³⁶ precariousness of the term “mutually assured destruction”. Imminent deterrence relates to international crises and will not be covered in this paper hence the case in this study is defence procurements and they span over decades.

General deterrence, contrary to immediate deterrence needs no enemy and can go on indefinitely.³⁷ It is defined by Morgan as the condition represented by “a) relations between opponents are such that at least one would consider attacking if a suitable occasion arose, (b) the other maintains forces and offers warnings of a forceful response to deter attack, and (c) the first party never goes beyond preliminary consideration of attacking because of the threat from the second party”.³⁸ This leads to the conclusion that if general deterrence succeeds, crises and wars do not occur. Sweden has not been at war the last 200 years and remained officially neutral throughout the Cold War but maintained a large military force to deter potential adversaries. Alliances are forged, armaments procured and forces prepared and deployed for the purpose of general deterrence.³⁹ Two major challenges are present in general deterrence; the stability problem and the credibility problem.⁴⁰ The stability problem is that forces employed to deter rather causes the situation to destabilise and increase the possibility of a military attack instead of preventing it.⁴¹ To mitigate the stability problem it

³¹ Freedman, *Deterrence*, p 34-36

³² Ibid p 36-40

³³ Ibid p 40-42

³⁴ Allison G., Zelikow P., *Essence of Decision: Explaining the Cuban Missile Crisis*, (Longman 1999)

³⁵ Morgan, *Deterrence Now*, p xvi

³⁶ Wohlstetter A., (1957) *The Delicate Balance of Terror*, *Foreign Affairs* 37

³⁷ Morgan, *Deterrence Now*, p 82

³⁸ Ibid p 80

³⁹ Ibid p 85

⁴⁰ Ibid p 114

⁴¹ Ibid p 93

has been tried to anticipate its effects in crisis and ease them before they arise.⁴² Credibility below nuclear force has been linked to actual use of force, though it is hard to create a reputation to which aggressors defer and even if you have a reputation convincing all.⁴³ Though, Morgan states that national defence credibility is less of a problem than possessing suitable capabilities hence being the military inferior can make an actor seem weak and undetermined.⁴⁴

Classical deterrence theory is based on rationality⁴⁵: gain and loss calculations to select the highest valued course of action.⁴⁶ However, Morgan points out that rationality is inconsistent with how deterrence empirical has turned out, but his only solution is to recommend to develop a new deterrence theory not relying on rationality⁴⁷. Edward Rhodes solves this problem by presenting a theory where actors both can be rational and irrational at the same time.⁴⁸ Quackenbush claims them both wrong; hence Morgan has failed to grasp the distinction between procedural and instrumental rationality, the latter being chosen according to personal preferences, since these preferences are subjective in nature, emotions, cognitive limitations, and the like may shape preferences but do not make an actor irrational, regardless of which procedures are used and that the solution to the problem lies in Zagare's and Kilgours PDT.⁴⁹ The in depth difference between procedural and instrumental rationality will not be further explained, but we must be aware that classical deterrence theory has some flaws when it comes to rationality and its empirical data. Zagare's and Kilgour's theory will be covered later in this chapter.

2.2 Conventional Deterrence

Conventional deterrence theory concerns itself with deterrence situations where only conventional military forces come into play. In his book *Conventional Deterrence*⁵⁰ first published in 1983, Mearsheimer claims there are two theories of conventional deterrence, one focusing on the actors' type of weaponry the other on the balance of forces between them, in addition to his own.⁵¹ The first theory divides weaponry into defensive and offensive, whereas one can conclude if the offensive weapons have the upper hand, deterrence is likely to fail and deterrence will succeed if the defensive weapons are dominant.⁵² However, weapons can be used both offensively and defensively and dependent on the situation and therefore undermine the theory. The second theory is concerned with the balance of forces, concluding that if the attacker has superiority of military forces (personnel and weaponry), deterrence will fail.⁵³ However, several historical cases contradict this connection between

⁴² Freedman, *Deterrence*, p 94

⁴³ Ibid p 102,104

⁴⁴ Ibid p 101

⁴⁵ Kaplan, *The Wizards of Armageddon*, p 10

⁴⁶ Morgan, *Deterrence Now*, p 11-12

⁴⁷ Ibid p 64

⁴⁸ Rhodes E. (1988) Nuclear Weapons and Credibility: Deterrence Theory beyond Rationality, *Review of International Studies*, Vol. 14, No. 1, p 45-62 and Rhodes E. (2000) Conventional deterrence, *Comparative Strategy*, 19:3, p 234-246

⁴⁹ Quackenbush, *Deterrence theory: Where do we stand?* p 748-749

⁵⁰ Mearsheimer, *Conventional Deterrence*

⁵¹ Ibid location 314-316

⁵² Ibid location 319-320

⁵³ Ibid location 360-365

the sizes of the military forces, such as Israel's 1967 decision to attack Egypt.⁵⁴ But, the two theories have some value according to Mearsheimer and he incorporates them both into his theory based on military strategy and the nature of how a nation's armed forces are employed.⁵⁵

Conventional deterrence, as defined by Mearsheimer in his book, is a function of the capability of denying an aggressor his battlefield objectives with conventional forces.⁵⁶ His theory is that deterrence is dependent of the particular military strategy of the aggressor and that the available strategies are: "attrition, blitzkrieg or limited aims".⁵⁷ When the aggressor has only the attrition option, fighting the enemy to the point of collapse through continuous losses, deterrence is likely to be successful due to the high cost of an attrition strategy.⁵⁸ On the modern battlefield, the blitzkrieg is the ideal tool for achieving a quick victory at a low cost and therefore this strategy is the most likely to lead to deterrence failure and Mearsheimer has a few suggestions, but no clear recommendations to deter this strategy.⁵⁹ The limited aims strategy, where the attacker seeks to capture a limited part of a territory, is the least risky and least costly because it tries to avoid contact with the defender, establish a new status quo where the aggressor take a defending posture.⁶⁰ The problem with this strategy is that aggressive nations often demand decisive victories and the risk that the defender continues fighting and start a war of attrition.⁶¹ The battle of Stalingrad during World War II saw this kind of warfare. To meet this strategy, the best deterrence is to have forward deployed forces to avoid being surprised.⁶²

In his article⁶³ on conventional deterrence Edward Rhodes presents his findings from a broad study of conventional deterrence literature. He states that there is a broad consensus in the literature on three conclusions:

Many potential adversaries are, at least at times, undeterrable; in dealing with adversaries that are deterrable, it is important to deny them the expectation of a quick military victory and political fait accompli; and, if deterrence fails and aggression occurs, threats to use conventional military force to impose suffering and destruction are less likely to compel the aggressor to capitulate than are threats to defeat its military forces and to deny it its politicalmilitary objectives.⁶⁴

He concludes that conventional deterrence can buy a defender time to achieve a peaceful solution especially if the challenger is risk adverse and the defender demonstrates commitment and capability by maintaining a forward deployed military presence and can

⁵⁴ Mearsheimer, *Conventional Deterrence*, location 376-383

⁵⁵ Ibid location 383-391

⁵⁶ Ibid location 124-125

⁵⁷ Ibid location 397-399, 1095-1096

⁵⁸ Ibid location 519-520

⁵⁹ Ibid location 416, 855-902

⁶⁰ Ibid location 425, 1099-1101

⁶¹ Ibid location 1102-1104, 913

⁶² Ibid location 935

⁶³ Rhodes, *Conventional deterrence*, p 221-253

⁶⁴ Ibid p 221

deny the aggressor a quick victory.⁶⁵ Rhodes ends though on a rather dismaying note on the probability for a successful conventional deterrence:

Because the costs of fighting and losing a conventional war may be acceptable; because the ongoing, dynamic process of conventional deterrence and the need for the deterrer to convey critical information mean that opportunities to "design around" conventional deterrent threats will be great; and because cultural differences, internal preoccupations, and psychological stress may make it difficult for potential aggressors to pay attention to deterrent threats, conventional deterrence routinely fails.⁶⁶

Rhodes believes conventional deterrence has little or no value, though he presents no true alternative and it has apparently been successful for non-NATO states like Finland and Sweden after World War II.

2.3 Perfect Deterrence Theory (PDT)

PDT merges nuclear and conventional deterrence into one theory applicable to both. Stephen Quackenbush claims there is no difference between nuclear and conventional deterrence due to three factors⁶⁷:

1. The concept of deterrence is broad and is not limited to either nuclear or conventional conflicts.
2. States have an interest in deterring both conventional and nuclear conflicts.
3. Classical deterrence theory's claims about nuclear deterrence – which are the basis of the analytic distinction between nuclear and conventional deterrence – are contradicted both logically and empirically.

Zagare and Kilgour present in their book *Perfect Deterrence*⁶⁸ a new deterrence theory that may solve the empirical and logical problems with classical deterrence theory stated by Quackenbush. At the same time their theory incorporates both classical and conventional deterrence theory since their theory can be applied all the way along the conflict scale up to and including use of nuclear weapons.⁶⁹ Zagare describes the theory as:

Perfect deterrence theory is a general theory of conflict initiation, escalation, and resolution, relevant to strategic interactions between both nuclear and nonnuclear states. The theory applies equally to general and immediate deterrence relationships, as well as to situations of direct and immediate deterrence. As a universal theory, its empirical domain includes, but is not limited to, interactions between major powers.⁷⁰

According to the authors the theory helps to explain not only the impact of credible and non-credible threats, force reductions, escalation dominance but also real-world outcomes, including limited conflicts, escalation spirals as well as the more classic deployment strategies as Massive Retaliation and Flexible Response.⁷¹

⁶⁵ Rhodes, Conventional deterrence p 250

⁶⁶ Ibid p 250

⁶⁷ Quackenbush, Deterrence theory: Where do we stand? p 752

⁶⁸ Zagare and Kilgour. *Perfect Deterrence*

⁶⁹ Ibid p 289

⁷⁰ Zagare F. C (2007) Toward a Unified Theory of Interstate Conflict, *International Interactions*, 33:3, p 307

⁷¹ Zagare and Kilgour. *Perfect Deterrence*, p 307-308

To develop their theory Zagare and Kilgour used game theory applied on several distinctive deterrence scenarios, divided into unilateral and mutual direct deterrence and extended deterrence. Game theory is the study of mathematical models of conflict and cooperation between intelligent rational decision-makers and provides mathematical techniques for analysing situations in which two actors makes decision that will influence the other's welfare.⁷² Game theory has had a dominant position in deterrence theory through the works of von Neumann, introducing the theory,⁷³ and Schelling with "non-zero-sum" games giving the possibility for a limited war between nuclear powers.⁷⁴ "Prisoners' Dilemma"⁷⁵ is a classic example in game theory. Zagare's and Kilgour's focus lies on capabilities, credibility, information (or lack of), preferences and their impact on the outcome.⁷⁶ The following section in an example of one of the games conducted by the authors and illustrates how the PDT were developed and applied in game theory.

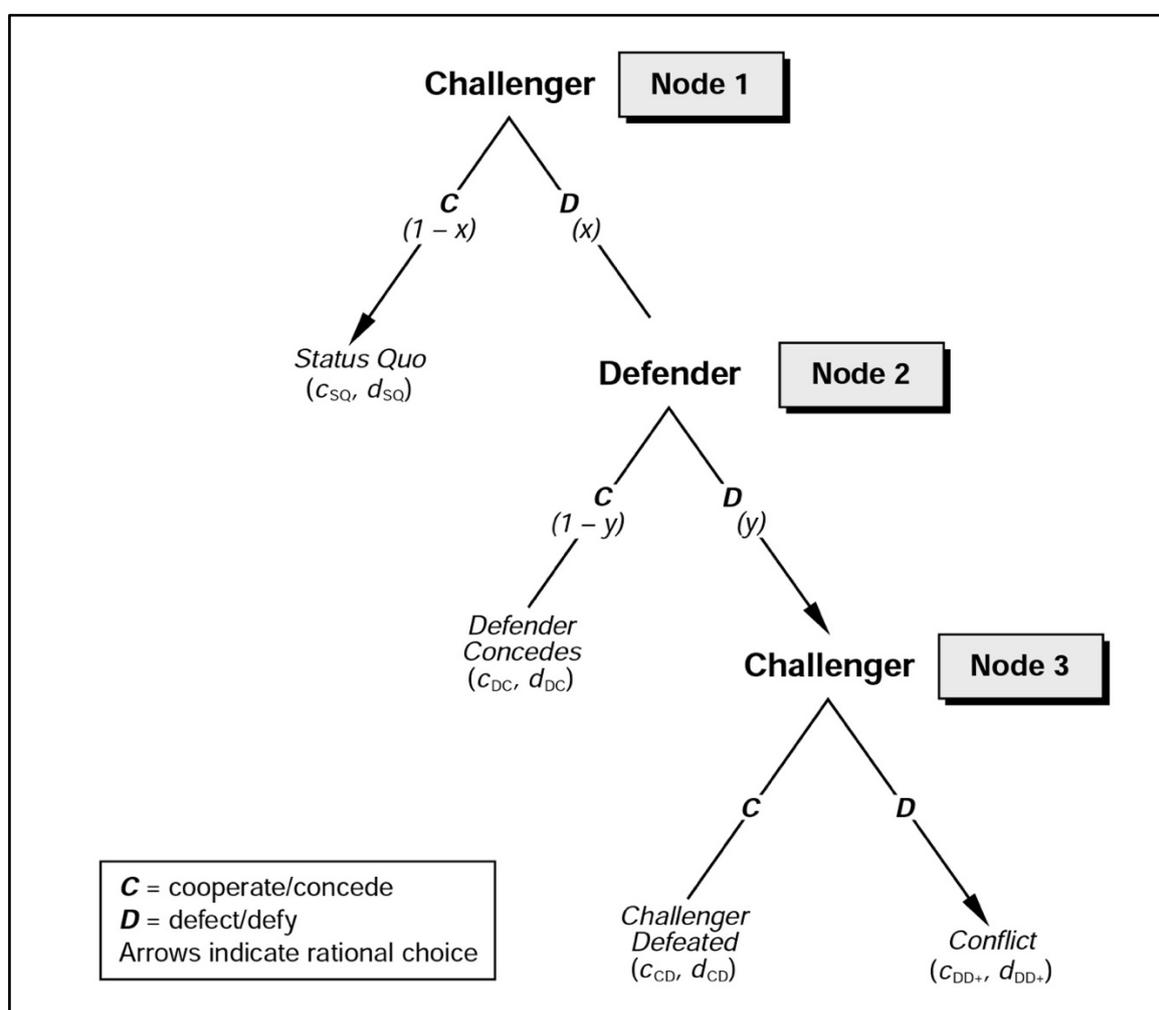


Figure 1; Unilateral deterrence sub-game with possible outcomes.⁷⁷

⁷² Myerson, R., *Game Theory – Analysis of Conflict*, (Harvard University Press, 1991), p 1

⁷³ Kaplan, *The Wizards of Armageddon*, p 65

⁷⁴ *Ibid*, p 330

⁷⁵ Kaplan, *The Wizards of Armageddon*, p 65-66

⁷⁶ Zagare and Kilgour. *Perfect Deterrence*, p xix-xxi

⁷⁷ *Ibid*, p 141

The figure shows the structure of the Unilateral Deterrence Game. The game has two players, Challenger (aggressor) and Defender. At the first node, Challenger has two options: defect or cooperate. Status Quo will remain unchanged if he selects to cooperate and if he selects defect it will lead to the Defender having to reply to the challenge. At the second node, Defender has two options: concede or defy. Selecting to concede will lead to the result Defender Concedes, but defying will play the ball back to Challenger in node 3. Now Challenger must either concede and thereby ending in Challenger Defeated or defy resulting in Conflict. We can also see from the figure that Challenger's rational choices leads to Status Quo in node 1 and Conflict in node 2. Pending on what stance the Challenger and Defender have, either Hard or Soft, the four possible outcomes are depicted in table 1. Hard representing a credible and capable threat and Soft representing a preference not to fight.⁷⁸

	Game 1		Game 2		Game 3		Game 4	
	Ch	Def	Ch	Def	Ch	Def	Ch	Def
p_{Ch} and p_{Def}	1	1	1	0	0	1	0	0
Type	Hard	Hard	Hard	Soft	Soft	Hard	Soft	Soft
Credible threat	Yes	Yes	Yes	No	No	Yes	No	No
Strategy	<i>C/D</i>	<i>D</i>	<i>D/D</i>	<i>C</i>	<i>C/C</i>	<i>D</i>	<i>C/C</i>	<i>C</i>
Subgame-perfect equilibrium outcome	<i>Status Quo</i>		<i>Defender Concedes</i>		<i>Status Quo</i>		<i>Status Quo</i>	

Key:
 Ch = Challenger
 Def = Defender
 p_{Ch} = probability that Challenger is Hard
 p_{Def} = probability that Defender is Hard
C = Cooperate/Concede
D = Defect/Defy

Table 1; Subgame-perfect equilibria for Unilateral Deterrence Games.⁷⁹

The above example shows the importance of capable and credible threats in PDT. It argues that mutual deterrence is most efficient when both actors possess these threats.⁸⁰ In this context, capable equates to threats that hurt and credibility are threats that can rationally be believed, a threat is believable only when it would be rational to carry it out.⁸¹ In this context a rational actor will only carry out acts that are in his best interest. This connection between rationality and credibility is the major difference that distinguish PDT from classical deterrence theory (the decision-theoretical strand).⁸²

Capability has two dimensions, according to the authors, one physical and one psychological and the latter concerns the capability to execute a threat and helps explain why a show of

⁷⁸ Zagare and Kilgour. *Perfect Deterrence*, p 139-143

⁷⁹ Ibid p 140

⁸⁰ Ibid p 289

⁸¹ Ibid p 289

⁸² Ibid p 289

force is an important signalling tactic in addition to augmenting credibility.⁸³ When a threat becomes capable this corresponds to the minimum cost necessary for deterrence success, resulting in a capable threat only makes deterrence possible when it exceeds the minimum cost.⁸⁴ Furthermore, the theory concludes that an increase in conflict cost past the lower threshold increases the probability of successful deterrence, but also reveals a maximum threshold past which further increment does not contribute to the probability of deterrence success.⁸⁵ Threat credibility is the essence of perfect deterrence theory and accordingly the quintessential determinant of successful deterrence.⁸⁶ The authors explain the universal application across time in the statement:

The centrality of credibility in the deterrence equation lies beneath a fundamental and persistent political regularity: the norm of reciprocity. For some time now, empirical researchers have been accumulating compelling evidence that political actors, including states, tend to respond-in-kind to one another, tit-for-tat, trading amity for friendship and enmity for hostility. It seems safe to say that the biblical injunction "an eye for an eye, a tooth for a tooth" is more descriptive of the interaction of great powers than is the biblical plea to "turn the other cheek."⁸⁷

The quote above supports the view most states would rather fight if military challenged than to make admissions to de-escalate and achieve peace at any cost.

PDT states that successful deterrence relies on the actors' evaluation of status quo, their threat capabilities and the interaction effect of their threat credibilities and if capability is absent, deterrence will always fail.⁸⁸ The probability for deterrence success is higher when the status quo is highly valued, or threats are credible throughout, or when the aggressor's threat has no credibility.⁸⁹ One can conclude that if the defender's retaliatory threat is highly credible: deterrence is certain.⁹⁰ No state has launched an attack on the USA, with its highly capable and credible threats, since the attack on Pearl Harbor in 1941.

Several of the strategic recommendations made by Zagare and Kilgour in *Perfect Deterrence* were not new within the field at the time of publishing and they do not claim to be revolutionary, however they claim to offer a consistent perspective in which to view the dynamics of deterrence and their recommendations are backed by logic.⁹¹

⁸³ Zagare and Kilgour. *Perfect Deterrence*, p 290

⁸⁴ Ibid p 292

⁸⁵ Ibid p 292

⁸⁶ Ibid p 296

⁸⁷ Ibid, p 296

⁸⁸ Ibid p 301

⁸⁹ Ibid p 301

⁹⁰ Ibid p 301

⁹¹ Ibid p 307

2.4 Threshold Defence as Deterrence

In Scandinavia and other small Northern European states, the term threshold defence has been used as a synonym or complementary word to conventional deterrence and can be found frequently in Norwegian governmental and military papers.⁹² For a small state to create capable and credible deterrence by denial towards a super power is very costly and close to impossible in a modern democracy, hence the focus on threshold defence. Lindström and Lindvall state that threshold defence can be seen as a limited deterrence within the frame of deterrence as: (1) a credible will to respond to an armed attack, (2) a credible capability to respond to an armed attack, and (3) a credible communication of the will and capability to respond to an armed attack.⁹³ The three Cs of deterrence, capability, credibility and communication.

Dalsjö claims that since defence happens after deterrence (first you deter, then you defend), threshold defence is more than deterrence even though deterrence is an integrated part of it since the threshold defence also serves a deterring purpose before a potential conflict.⁹⁴ Threshold defence, according to Dalsjö, consist of five dimensions: deterrence, defence/obstacle, marker, alarm-bell, and trip-wire.⁹⁵ Deterrence is self-evident in relation to the description above and defence/obstacle is the capability to perform conventional military operations to defeat or delay the enemy in order to achieve own aims and objectives. The defence dimension contains a purpose of maximising the adversary's cost, obstruct its plan and lose its initiative.⁹⁶ The marker dimension refers to marking willingness to fight and communicate messages to a potential aggressor.⁹⁷ The alarm-bell dimension's purpose is to in case of deterrence failure clearly show ones own population and the world that war has broken out.⁹⁸ The purpose of the trip-wire is for the defender to get other states to involve themselves in the conflict on the defender's side.⁹⁹ To achieve this, it might be necessary for the defender to escalate the conflict either horizontally or vertically to get the needed attention and commitment from other states.¹⁰⁰ The alarm-bell and trip-wire dimension are closely related, however the first is about getting national and international attention, while the latter is getting international committed military support.

2.5 Applied Theory

2.5.1 Introduction to Applied Theory

This study relates to Norwegian procurement projects and deterrence, and since Norway is not a nuclear arms power, it is self-evident that applying classical deterrence theory to this research problem would demand significant adaptation of the theory that would be outside the scope of this work. Conventional deterrence theory (Mearsheimer) will neither be used

⁹² Dalsjö, Five dimensions, p 6

⁹³ Lindström M. and Lindvall F. (2015) If you want peace, prepare for war. Perspectives on capabilities raising the bar. *FOI-R--4047—SE*, p 5

⁹⁴ Dalsjö, Five dimensions, p 15

⁹⁵ *Ibid* p 4

⁹⁶ *Ibid* p 19-20

⁹⁷ *Ibid* p 4

⁹⁸ *Ibid* p 19

⁹⁹ *Ibid* p 24

¹⁰⁰ *Ibid* p 20-21

to any extent, hence its focus on land/armoured warfare as well as deterrence by denial between more or less equal partners and my case focus consists of one naval and one air capability in a context of a small state versus a super power. Henceforth, I will concentrate on Zagare's and Kilgour's theory, the PDT since it can be applied to any level of dispute reaching from a personal conflict to conflicts between states or alliances. Within the theory I will focus on the main conclusion of the importance of capable and credible threats and not use the developed game theory games. I will also merge Dalsjö's dimensions of threshold defence into the PDT, representing a capable and credible threat.

2.5.2 Application of Theory on the Framed Problem

The problem this study looks at is that procurement projects take years to plan and execute before they deliver the intended military capability planned at the outset of the project. It is hard to know whether they will create the desired deterrence when fully operational. The question I try to answer is: Do Norway's strategic military capability procurement projects contribute to a credible and capable deterrence?

The PDT in the context of deterrence theory is a new theory, and it can be applied to both conventional and nuclear deterrence. The PDT sub-chapter concludes that the main focus of the theory is capable and credible threats. I will look upon my chosen capabilities, the fighter jets and the submarines, as implied threats to a potential aggressor. In Norway's case, the only relevant potential aggressor is Russia. Dalsjö talks about five dimension of military threshold defence, and I will add them into the perfect deterrence theory's capable and credible threats. The four additional dimensions to deterrence in the threshold defence are: defence/obstacle, marker, alarm-bell, and trip-wire. My opinion is that these four dimensions feed into deterrence and especially into making a threat capable and credible. Contrary to Dalsjö, I look upon the threshold defence as an integrated part of deterrence. Dalsjö correctly points out defence only really comes into play after deterrence has failed, but a defender cannot deter an aggressor without having a relevant defence to threaten with. PDT highlights the importance of capable and credible threats and my opinion is that a threat can be assessed as credible if it fit the four additional dimensions of threshold defence in addition to being capable to inflict harm, using its military properties, on the aggressor.

My hypothesis is that if a procurement project leads to a capable military weapon system able to inflict serious harm on an attacker and fulfil the four additional dimensions of threshold defence it is likely to be a credible and capable threat to a challenger and hence will deter in accordance with PDT.

2.5.3 Summary

I have presented three fields of deterrence theory as well as military threshold defence's role in deterrence. Even though I have focused on the two latter, I have included classical deterrence as it lays the foundation for PDT and the military threshold defence can be looked upon as an integrated part of the PDT and conventional deterrence. I argue, contrary to Dalsjö, that the threshold defence is in nature deterrence even though it contains other dimensions. The four other dimensions of military threshold defence: defence/obstacle, marker, alarm-bell, and trip-wire, are what makes the threat credible alongside its inherent military capability and impeccably in line with PDT. The most important factor of a successful deterrence is a capable and credible threat.

3. Method

The purpose of this study is to gain a deeper understanding of the deterrence potential of two Norwegian military capabilities, the new fighter jets and the planned new submarines. It will be conducted within the area of social science and the field of War Studies. Though deterrence can be said to belong to the closely related security studies, this study falls within War Studies hence its focus is not only on deterrence, but how military capabilities are created and applied in peace, crisis and war and their impact to deterrence.¹⁰¹

3.1 Chosen Method

A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context,¹⁰² and this will be a qualitative textual analysis of my case to achieve a deeper understanding of specific military capabilities' contribution to deterrence. I will apply theory to evaluate a present policy,¹⁰³ the case of military defence investments.

A more quantitative approach (large-n study) looking into a higher number of Norwegian procurement projects, select and give values to each of their individual warfare areas and other capabilities like stealth and self-sustainment was considered, but was abandoned due to the apparent security classification of this type of data. Furthermore, the main objective of this study is to obtain a deeper understanding of deterrence using the qualitative approach with respect to the two military capabilities selected. The theory/hypothesis described earlier will be applied to my case in order to answer my research question. A degree of comparative case study analysis will also be presented since I have chosen a case consisting of two projects that will be analysed within the same case.

3.1.1 General Description of Method

A qualitative textual analysis of a case is a useful tool to investigate and explain a specific situation, however, like any scientific method it has its strengths and weaknesses. Case studies are good for answering "how" or "why" questions, when the events are outside the researchers control and the focus is contemporary real-life phenomenon,¹⁰⁴ which this study is. Typical weaknesses are selection-bias¹⁰⁵ and representation, and this study will only represent a deeper understanding of the two specific projects chosen within the case and can be said to be biased since the selection criteria is high investment cost. My research design is based on Yin's definition:

.... a research design is an action plan for getting from here to there, where 'here' may be defined as the initial set of questions to be answered, and 'there' is some set of conclusions (answers) about these questions. Between 'here' and 'there' may be found a number of major steps, including the collection and analysis of relevant data.¹⁰⁶

¹⁰¹ Widen, J. & Ångström J., *Militærteorins grunder*, (Försvarsmakten 2004), p 11

¹⁰² Yin, R.K., *Case Study Research-Design and Methods*, (SAGE Publications 2003), p 13

¹⁰³ Van Evera, S. *Guide to Methods for Students of Political Science* (Cornell University Press, 2015, Kindle) locations 84

¹⁰⁴ Yin, R.K., *Case Study Research*, p 1

¹⁰⁵ Geddes, B. (1990). How the Cases You Choose Affect the Answers You Get: Selection Bias in Comparative Politics. *Political Analysis*, 2, p 131-150

¹⁰⁶ Yin, R.K., *Case Study Research*, p 20

My research question is to be answered through a qualitative textual analysis by finding answers to a number of specific research questions within the texts analysed.¹⁰⁷ It is important that the questions that work as an analytical tool, must be looked upon as empirical indicators of the studied phenomena and be valid.¹⁰⁸ The validity¹⁰⁹ of my specific research questions is evident as they are clearly anchored in the theory chapter. Reliability¹¹⁰ is secured by using Norwegian Governmental official documents as primary source, they are historically assessed to be reliable, though there might be inaccurate, inconsistent or omitted data due to security classifications. Technical specifications are sourced from "IHS Jane's" and the main contractors' websites and the data will be treated conservatively as they might be best case scenarios intended to promote sales. A single case study bears the weakness that the result cannot necessary be generalised and applied on other cases.¹¹¹ This applies to my case as well, but to a less extent since the case consists of two subjects studied within the case and the purpose is to gain further understanding into a specific situation, not develop a theory.

3.2 Operationalising of Theory and Method

This thesis aims to answer the following research question:

Do Norway's strategic military capability procurement projects contribute to a credible and capable deterrence?

This study applies a deterrence theory lens, primarily based on the conclusion in Zagare's and Kilgour's perfect deterrence theory about the importance of capable and credible threats to address the research question. To be able to do this the theory was adapted to War Studies and a Norwegian military context by linking the military threshold defence to it. The next step in the research design¹¹² is to develop the specific research question to fit with the applied theory and threshold defence. Thereafter the answers to the specific questions will be identified in the textual data, mainly Norwegian Governmental papers and data from the main contractors. Finally, the results will be discussed to conclude on the main research question and a further understanding of the two projects' input to deterrence.

3.2.1 Merging of Theory and Method

This study suggests if a procurement project leads to a capable weapon system able to inflict serious harm on an attacker and feeds into the four additional dimensions of threshold defence it is likely to be a credible and capable threat to a challenger and hence will deter him in accordance with PDT. Logically this leads to questions which need to be formulated to cover the subject capable of inflicting harm on an adversary and the matters of the four dimensions of military threshold defence: defence/obstacle, marker, alarm-bell and trip-wire. The dimensions alarm-bell and trip-wire will be analysed through one question hence they are closely linked together. The question related to Dalsö's dimension marker is re-labelled

¹⁰⁷ Esaiasson P., Gilljam M., Oscarsson H, Wängnerud L. *Metodpraktikan- Konsten att studera samhälle, individ och marknad*, (Nordstedts Juridik AB, 2012), p 215

¹⁰⁸ Ibid p 216

¹⁰⁹ Ibid p 57-63

¹¹⁰ Ibid p 63-65

¹¹¹ Van Evera, *Guide to Methods*, locations 865-868

¹¹² Yin, *Case Study Research*, p 20

dedication. The answers to the operationalising questions will be individually identified in both procurement projects' data.

To analyse if the military capability procurement project contributes and represents a capable part of a deterrence threat I will ask the question below, labelled **capability**:

1. Do the projects lead to sufficiently capable military weapon systems able to inflict serious harm on an attacker (**capability**)?

The military capability project's contribution to the four additional dimensions representing a part in a credible deterrence threat, will be conducted by asking the following questions (labelling in brackets):

2. How do the procured capabilities contribute offensively and defensively (**defence/obstacle**)?
3. Do the projects show defence dedication(**dedication**)?
4. How will the procured capabilities strengthen credibility in national commitment and trigger international military support in case of deterrence failure (**alarm-bell/trip-wire**)?

Question 1, capability, will look into the physical properties of the weapon system like speed, range, fire power, sensor coverage and stealth related to different mission types/warfare areas and assessed if it is sufficiently capable on inflicting harm on an attacker.

Question 2, defence/obstacle, will investigate the operational application of the capability, looking for how likely it is to win, its survivability, its operational availability and as a force multiplier in a joint/combined context defensively and offensively.

Question 3, dedication, will look at support functions/facilities to the weapon systems, financial impact and strategic commitments and cooperation related to the projects.

Question 4, alarm-bell/trip-wire, will look at how the weapon system will be involved in an armed conflict and what signals that may send in a national and international context.

At the end of the analysis of each question, the answer to the current dimension will be assessed as to if the project in question contribute positive or negative to Norwegian deterrence. At the end of the analysis I will present the conclusions for both projects based on the findings in the analysis. The method process is depicted in the figure below.

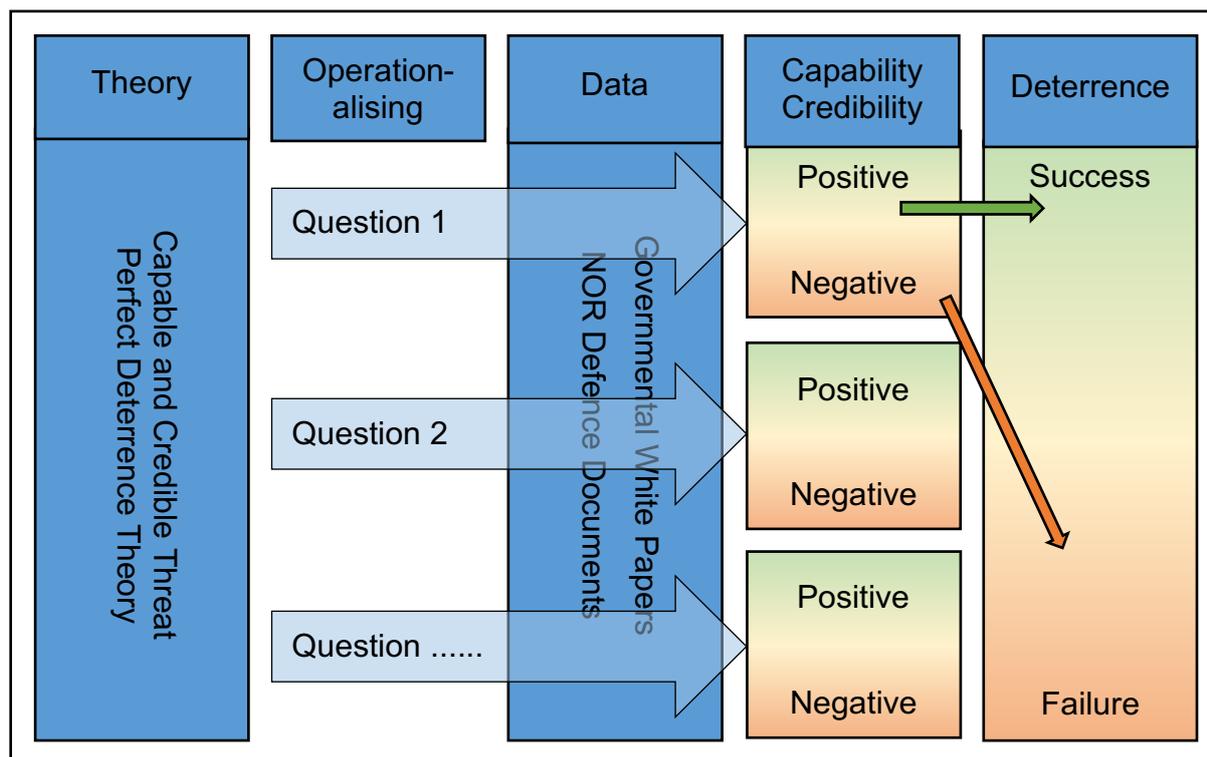


Figure 2; The study's method including its operationalising

The starting point for the study is the PDT which is then operationalised through four questions related to a capable and credible deterrence threat. These questions are used to conduct a textual analysis of data from two Norwegian military capability procurement projects, the acquisition of fighter jets and submarines. Each question will be answered in the end if the project can be assessed to have a positive or neutral impact as part of a capable and credible deterrence threat.

Question one (capability) answers if the procured weapon system is a capable threat and question two till four (defence/obstacle, dedication, alarm-bell/trip-wire) answer how credible a threat the weapon system is.

In the end the results will be compiled to give an answer on the general research question: Do Norway's strategic military capability procurement projects contribute to a credible and capable deterrence? A positive outcome in all four specific questions will result in a clear yes, two or more negative outcomes will result in a clear no and three positives and one negative will give a maybe for the specific project.

4. Analysis

Two major Norwegian military procurement projects are analysed below with the purpose to determine if they contribute to a capable and credible threat in the context of deterrence. The analysis is split into two identical parts, one for the F-35 fighter jet and one for the 212CD submarine, where sourced data has been textual analysed to answer the specific research questions. The four specific questions named: capability, defence/obstacle, dedication and alarm-bell/trip-wire build the foundation to understand to if the two projects produce parts of a capable and credible threat and ultimately answer the general research question of this study: Do Norway's strategic military capability procurement projects contribute to a credible and capable deterrence?

4.1 The Norwegian F-35 Procurement Project

The F-35 Lightning II is a US designed and built fifth generation fighter aircraft. On 19th December 2008 the Norwegian Parliament approved the investment to procure a fleet of F-35 to the Norwegian Armed Forces as replacement for its aging F-16 Fighting Falcon fleet.¹¹³ The investment relates to the complete fighter jet capability including in addition to the jets themselves, weaponry, upgraded airfields, command and control facilities, logistics and sustainment throughout the whole life cycle of the aircrafts.¹¹⁴ The F-35 are a multi role fighter and intended to be capable in solving the whole spectre of missions in national and international context within the four categories of Air Power: Anti-Air, Anti-Surface (ground and maritime), Air-Support and Strategic Operations.¹¹⁵

4.1.1 Capability

Designed as a multi-role fighter jet the F-35 is able to conduct a wide range of mission types from air-to-air combat, air-to-ground strikes, electronic attack and intelligence, surveillance and reconnaissance (ISR) without support of other types of aircrafts.¹¹⁶ Lockheed Martin Corporation who produce the F-35 fighter jet presents the aircraft as:

The F-35 Lightning II is referred to as a 5th Generation fighter, combining advanced stealth capabilities with fighter aircraft speed and agility, fully-fused sensor information, network-enabled operations and advanced logistics and sustainment.¹¹⁷

The aircrafts range is more than 1,200 nm and its combat radius exceeds 590 nm and it can reach a speed of Mach 1.6 with a full internal weapons load.¹¹⁸

The F-35 is designed with stealth in mind in all areas ranging from airframe design, material and manufacturing, sensors and internal weapons bay to mention a few, providing the aircraft

¹¹³ Norwegian Ministry of Defence, *St.prp. Nr. 36 (2008-2009) Nye kampfly til Forsvaret*

¹¹⁴ Norwegian Ministry of Defence, *Utvidet fremskaffelsesløsning for prosjekt 7600 - Nye kampfly*, p 6

¹¹⁵ Norwegian MOD, *St.prp. Nr. 36*, p 2

¹¹⁶ Lockheed Martin F35 Lightning II, Multi-Mission Capability for Emerging Global Threats
<https://www.f35.com/about/capabilities> 2018 (Accessed 30 January 2018)

¹¹⁷ Ibid

¹¹⁸ Lockheed Martin F35 Lightning II, F-35 LIGHTNING II Program Status and Fast Facts
https://a855196877272cb14560-2a4fa819a63ddcc0c289f9457bc3ebab.ssl.cf2.rackcdn.com/13567/f-35_fast_facts_jan_2018.pdf 2018 (Accessed 31 January 2018)

with a low observable stealth performance.¹¹⁹ Stealth can be defined as the ability to evade detection by radar, infrared sensors or emission interception and the F-35's stealth performance allows it to operate in contested areas, including anti-access/area denial (A2AD) environments that 4th generation fighter jets cannot do and hereby significantly improving the probability for successful weapon delivery and increased survivability.¹²⁰

In air-to-air combat the F-35's integrated sensors, information and weapons systems give pilots an advantage over adversary fighter jets.¹²¹ The F-35 have a smaller radar signature and better sensors than other fighter aircrafts and can hence detect the enemy before they can detect the F-35, resulting in that it can fire its anti-air missiles at long range before the enemy can respond.¹²² The standard anti-air armament for the F-35 is two AIM-120C/D (AMRAAM) air-to-air missiles.¹²³ The AMRAAM is combat proven and possesses high manoeuvrability and speed (up to Mach 4), has a range of up to 160 km and a warhead of 23 kg high explosives (HE).¹²⁴

Air-to-surface combat can either be attack on ground targets or maritime surface vessels. F-35 stealth also gives it a higher survivability than other jet fighters in a high threat environment and its high end active electronically-scanned array radar lets it find and engage the assigned targets.¹²⁵ The standard weapons load in the internal weapon bay against ground targets would be two precision guided 2,000-pound bombs.¹²⁶ A bomb consisting of 2,000 lbs of high explosive can destroy or inflict serious damage to a range of ground targets like military vehicles, ground-based air defence system, runways and buildings. The Norwegian F-35 will also be armed with Joint Strike Missiles (JSM).¹²⁷ The JSM is designed to operate in either an anti-surface warfare (ASuW) or naval gunfire support/strike role on targets in open seas, the littoral or over land.¹²⁸ The JSM are lethal to a range of surface ships and ground structures, delivering 120 kg HE very accurate in the target at 370km range and with high survivability in a high threat environment.¹²⁹

¹¹⁹ Lockheed Martin F35 Lightning II, STEALTH CAPABILITIES Virtually Undetectable <https://www.f35.com/about/capabilities/stealth> 2018 (Accessed 30 January 2018)

¹²⁰ Ibid

¹²¹ <https://www.f35.com/about/capabilities>

¹²² Ibid

¹²³ <https://a855196877272cb14560-2a4fa819a63ddcc0c289f9457bc3ebab.ssl.cf2.rackcdn.com/13567/f-35-fast-facts-jan-2018.pdf>

¹²⁴ Military-Today, AIM-120 AMRAAM http://www.military-today.com/missiles/aim120_amraam.htm 2006-2017 (Accessed 31 January 2018)

¹²⁵ <https://www.f35.com/about/capabilities>

¹²⁶ <https://a855196877272cb14560-2a4fa819a63ddcc0c289f9457bc3ebab.ssl.cf2.rackcdn.com/13567/f-35-fast-facts-jan-2018.pdf>

¹²⁷ Norwegian MOD, *St.prp. Nr. 36*, p 9

¹²⁸ Kongsberg Gruppen, Joint Strike Missiles

<https://www.kongsberg.com/en/kds/products/missilesystems/jointstrikemissile/> 2017 (Accessed 31 January 2018)

¹²⁹ IHS Jane's Weapons, *Naval 2012-2013*, (IHS Global Limited 2012), p 194-195 and Kongsberg Gruppen, Joint Strike Missiles Brochure <https://www.kongsberg.com/en/kds/products/missilesystems/jointstrikemissile/> 2017 (Accessed 31 January 2018)

The Norwegian Government has the intention of procuring a total of 52 (including 4 training) F-35 aircrafts, with delivery started in 2017 and is expected to be completed by 2025.¹³⁰

We can conclude on the first specific research question, even if the manufacturer's claim of a *quantum leap in air dominance*¹³¹ is inflated, that the Norwegian F-35 fleet consisting of a total of 48 aircrafts will be able to inflict serious harm on an attacker's military forces and infrastructure and to a much higher extent than the current F-16 due to its superior stealth and sensor package. This will give a positive contribution to the overall capability part of the deterrence threat, it will hurt¹³².

4.1.2 Defence/Obstacle

The F-35, as part of the Royal Norwegian Airforce's inventory, is supposed to act as a multirole fighter jet and perform missions in the four categories of Air Power: Anti-Air, Anti-Surface (ground and maritime), Air-Support and Strategic Operations.

According to a Lockheed Martin Cooperation capabilities study of 2010, the F-35 outperforms other fighter jets and are six times more effective in air-to-air missions.¹³³ This is due to better manoeuvrability, aerodynamics, range, and acceleration capabilities than other modern fighter jets (advanced 4th generation) and alongside the unique sensor suite this give the F-35 a larger than six times loss exchange ratio in an air-to-air scenario with an advanced threat.¹³⁴ This will enable the F-35 to achieve local air-superiority limited in time and space, creating favourable conditions for the defending land and naval forces as well as denying the adversary free use of the airspace.

In Lockheed Martin's capabilities study, it was concluded that the F-35's combination of stealth, sensors, fused data, range and payload to locate, destroy and battle assess ground targets made it eight times more effective than an advanced 4th generation fighter jets in a high threat environment.¹³⁵ Modern ground forces often rely on close air support (CAS) and the F-35 can clearly support in the territorial defence of Norwegian soil.

Modern warfare is dependent on good intelligence and surveillance data to exploit opportunities and utilise limited forces to achieve maximum effect. The F-35 claims to be more than six times more effective in surveillance missions since the aircraft's ISR capabilities and stealth enable a much further track depth compared to other fighter jets.¹³⁶ The F-35 has a powerful and comprehensive integrated sensor package giving pilots access to real-time battlefield information that can be securely shared with other friendly air, naval or land forces making the F-35 a force multiplier.¹³⁷ The F-35 also possess advanced electronic warfare capabilities used to locate and track enemy forces as well as being able to jam radars and

¹³⁰ Norwegian MOD, *Prop. 151.S*, p 63-64

¹³¹ <https://www.f35.com/about/capabilities>

¹³² Zagare and Kilgour, *Perfect Deterrence*, p 289

¹³³ Lockheed Martin F35 Lightning II, F-35 vs. Legacy Fighters

https://www.f35.com/assets/uploads/documents/F-35_vs_Legacy.pdf 2010 (Accessed 30 January 2018)

¹³⁴ Ibid

¹³⁵ Ibid

¹³⁶ Ibid

¹³⁷ <https://www.f35.com/about/capabilities>

disrupt attacks.¹³⁸ The F-35's ISR and EW capabilities clearly contribute to hampering the attacker and promoting the defender.

Operational availability is a cornerstone in any military capability and is dependent on technical availability (the system needs to be working), logistic sustainment (maintained and resupplied) and readiness status (personnel trained and available). Without a high level of operational availability, the capability runs the risk to be useless when it's needed. The Norwegian Government's last white paper on long term defence planning highlights the short reaction time one can expect in a conflict with Russia.¹³⁹ A Quick Reaction Alert readiness to intercept Russian aircrafts approaching Norwegian airspace will be established at the forward operating base at Evenes in North-Norway.¹⁴⁰ The QRA requirement in addition to the requirement for high air defence readiness and continuous Combat Air Patrol (CAP) have been used to calculate the required number of aircrafts and pilots, concluding on 48 aircrafts and 62 pilots, however how long the high air defence readiness and CAP can be maintained is not stated.¹⁴¹ The F-35 is intended to take over the ASuW tasks of the Skjold-class coastal corvettes when the Skjold-class are decommissioned in the mid 2020ies.¹⁴² However to maintain continuously 24 hour coverage for an extended time in an area is extremely more resource demanding with fighter jets than with a naval surface vessel hence it will demand a high number of aircrafts and pilots as well as generate significant maintenance and sustainment work.

The F-35 will have one main operating base in Central-Norway, Ørland, and one forward operating base in North-Norway, Evenes.¹⁴³ Operating from just one main base will make the F-35 vulnerable to a surprise attack¹⁴⁴, for example with submarine launched cruise missiles or special forces. To mitigate this threat the two bases are planned to be protected with long range ground-based air defence, regular force protection troops and scattering of hangars.¹⁴⁵ It is hard however to envision how a scattering of hangars can be conducted on Evenes due to the local geography. The planned capacity of the air defence is not mentioned, but it might be possible to saturate the defence by conducting a combined submarine- and air-launched attack with long range precision guided missiles.

From the analysis it is obvious that the F-35 can contribute both defensively and offensively towards an attacker on its own or joint, however there are three issues that can constitute a challenge in the context of a credible threat and two are closely linked. The first issue is that the superior capabilities of the F-35, especially when it comes to stealth, may result in a potential adversary looking upon the F-35 as a first strike tactical threat that he finds himself forced to strike first and neutralise the F-35 in an emerging crisis, a stability problem¹⁴⁶. This opportunity materialises in the second issue, whereas the major part of the F-35 fleet is concentrated in one main operating base: all the eggs are in one basket. A threat that can be

¹³⁸ <https://www.f35.com/about/capabilities>

¹³⁹ Norwegian MOD, *Prop. 151.S*, p 29

¹⁴⁰ Norwegian MOD, *St.prp. Nr. 36*, p 7

¹⁴¹ *Ibid* p 7-8 and Norwegian MOD, *Prop. 151.S*, p 64

¹⁴² Norwegian MOD, *Prop. 151.S*, p 60

¹⁴³ *Ibid* p 62

¹⁴⁴ Wohlstetter, *The Delicate Balance of Terror*, p 220

¹⁴⁵ Norwegian MOD, *Prop. 151.S*, p 64-65,76

¹⁴⁶ Morgan, *Deterrence Now*, p 93

nullified by a pre-emptive strike lacks capability.¹⁴⁷ The last issue is that due to the low number of aircrafts and pilots and the duration the air force can maintain high air defence readiness and continuously CAP covering ground, naval and air threats are limited. There is a good chance both pilots and support personnel will be exhausted, as well as aircrafts grounded due to maintenance requirements relatively early into a serious crisis situation. These three issues' significant negative impact reduces the F-35 contribution to the credibility part of the deterrence to negative in the defence/obstacle question.

4.1.3 Dedication

The F-35 project estimated investment cost is 71.5 billion NOK and the estimated life cycle cost 268.1 billion NOK and represent the largest ever defence investment in Norway.¹⁴⁸ An investment of this size is a major commitment for Norway bearing in mind the 2018 defence budget of 55 billion¹⁴⁹ and shows the importance of the F-35 project. There is a focus on maximum operational available aircrafts through more training and exercises, improved infrastructure and long-term cost cutting measures like fewer bases being implemented to achieve this.¹⁵⁰ The operational record of the Norwegian F-16 fleet shows Norway is capable of operating and maintaining a modern air force.

The F-35 is planned to be regularly deployed under NATO command in both standing forces and upcoming missions.¹⁵¹ By selecting US aircraft Norway contributes to better cross-Atlantic burden sharing of collective defence.¹⁵²

The economical commitments and prioritising operational availability related to the F-35 are significant and in that context shows a clear defence dedication. NATO deployment of high value assets as the F-35 shows a clear dedication to the Alliance and collective defence. By choosing US equipment Norway shows a clear willingness to improve the political, military and financial relations with a super-power. This leads to the F-35 project creating a dedication with a positive impact on a credible deterrence.

4.1.4 Alarm-bell/Trip-wire

The Norwegian F-35 project continuously receives a significant amount of national media attention mainly due to its military capabilities and high cost and the same can be said of the global F-35 project internationally.

A military violation of Norwegian territory in Northern-Norway will be hard without the involvement of the forward based F-35 at Evenes hence their short response time and combat radius.¹⁵³

¹⁴⁷ Zagare and Kilgour, *Perfect Deterrence*, p 291

¹⁴⁸ Norwegian Ministry of Defence, Hva koster egentlig nye kampfly, <https://www.regjeringen.no/no/tema/forsvar/innsikt/kampfly/hva-koster-egentlig-nye-kampfly/id710435/> 2017 (Accessed 5 February 2018)

¹⁴⁹ Norwegian Ministry of Defence, *Prop. 1.S (2017-2018) Budsjettåret 2018*, p 171

¹⁵⁰ Norwegian MOD, *Prop. 151.S*, p 20,27

¹⁵¹ Norwegian MOD, *St.prp. Nr. 36*, p 2,5

¹⁵² Norwegian MOD, *Prop. 151.S*, p 20

¹⁵³ *Ibid* p 23,24,62

The global F-35 program involves nine NATO-nations.¹⁵⁴ Creating a NATO hub in Norway for F-35 training and operations, as well as an increased US Marine Corps presence has been recommended and the Norwegian Government intend to increase international cooperation related to the F-35.¹⁵⁵ This will increase the possibility for NATO involvement early in a conflict and enable the possibility of a seamless escalation in accordance with Norwegian policy.¹⁵⁶

A crisis or conflict in the high North will involve deployment of the F-35 and combat engagement of the F-35 is likely to raise high attention both nationally and internationally, especially if aircrafts or lives are lost. If this engagement involves Allied aircraft an international escalation of a crisis or conflict is even more likely, tit-for-tat¹⁵⁷, hence the high political prestige involved in the global F-35 program. The F-35 will contribute to strengthen the credibility by acting as an alarm-bell/trip-wire in case of an attack on Norway and contribute positively in deterrence.

¹⁵⁴ Lockheed Martin F35 Lightning II, Global participation <https://www.f35.com/global> 2018 (Accessed 30 January 2018)

¹⁵⁵ Expert Commission on Norwegian Security and Defence Policy, *Unified Effort*, (Norwegian Ministry of Defence, 2015), p. 82,84 and Norwegian MOD, *Prop. 151.S*, p 19-20,31

¹⁵⁶ Norwegian MOD, *Prop. 151.S*, p 18

¹⁵⁷ Zagare and Kilgour, *Perfect Deterrence*, p 296

4.2 The Norwegian Future Submarine Procurement Project

Conceptual studies for the replacement of the Ula-class submarines has been ongoing since 2007,¹⁵⁸ and on 21st April 2017 the Norwegian Parliament approved investment to procure four new submarines, 212CD built by ThyssenKrupp Marine Systems (tkMS).¹⁵⁹ The acquisition will be part of a strategic cooperation with Germany, where Germany has committed to procure two submarines of the same class.¹⁶⁰ New maintenance facilities, simulators and armament are part of the procurement project.¹⁶¹

4.2.1 Capability

The current 30-year-old Ula-class has a range exceeding 5000 nm, maximum speed of 23 knots and an endurance of over 30 days,¹⁶² the 212A has similar capabilities,¹⁶³ and the requirements for the new Norwegian submarines are likely to be equal or better compared to both. This will enable the 212CD to conduct local sea-denial operations (preventing an adversary from controlling a maritime area) throughout the Norwegian Sea and Barents Sea, close to Russian territory and naval bases.

The 212A-class submarine is described by tkMS as:

..., this non-nuclear but air-independent submarine remains compact, with a high payload in the field of sensors, communication equipment, weapon control systems and weapons. Extreme attention has been paid to efficiency and energy management on board. The combination of these factors with the non-magnetic construction and acoustically optimised equipment resulted in submarines that are nearly impossible to detect.¹⁶⁴

The current main weapon of the 212A is the SeaHake mod4¹⁶⁵ long range wire-guided heavyweight torpedo capable of sinking or destroying any surface vessel or submarine.¹⁶⁶ The 212A can be armed with up to 13 heavyweight torpedoes¹⁶⁷, launched from six tubes,¹⁶⁸ that each can destroy high value targets such as submarines, command platforms, landing ships, tankers or cargo ships.

If equipped with missiles, a submarine launched JSM or a land attack missile, the 212CD will possess a strike capability capable of pin-point targeting key assets on land and in the littorals.

¹⁵⁸ Norwegian Ministry of Defence, Nye ubåter 2018

<https://www.regjeringen.no/no/tema/forsvar/innsikt/ubater/nye-ubater/id2586717/> (Accessed 20 February 2018)

¹⁵⁹ Norwegian Ministry of Defence, *Prop. 123 S (2016-2017) Investeringar i Forsvaret og andre saker*

¹⁶⁰ Ibid p 5

¹⁶¹ Ibid

¹⁶² Jane's, *Fighting Ships 2011-2012* (IHS Global Limited 2011), p 571 and Military-Today, Ula-class

http://www.military-today.com/navy/ula_class.htm 2006-2017 (Accessed 31 January 2018)

¹⁶³ Jane's, *Fighting Ships*, p 281

¹⁶⁴ ThyssenKrupp Marine Systems, HDW Class 212A <https://www.thyssenkrupp-marinesystems.com/en/hdw-class-212a.html> 2018 (Accessed 6 February 2018)

¹⁶⁵ IHS Jane's Weapons, *Naval 2012-2013*, p 259-261

¹⁶⁶ Atlas Elektronik, SeaHake mod4 www.atlas-elektronik.com/solutions/naval-weapons/seahake-mod4.html 2017 (Accessed 31 January 2018)

¹⁶⁷ <https://www.thyssenkrupp-marinesystems.com/en/hdw-class-212a.html>

¹⁶⁸ Jane's, *Fighting Ships*, p 281

We can conclude that the heavily armed 212CD will be able to inflict serious harm on an attacker's military forces and infrastructure. This will give a positive contribution, the threat hurts,¹⁶⁹ to the overall capability part of the deterrence threat.

4.2.2 Defence/Obstacle

A submarine's main advantage is its stealth that provides it with high survivability and possibility to attack undetected. The 212A can stay completely submerged for weeks because of air-independent propulsion, has very low acoustic signatures due to equipment configuration as well as an extreme low magnetic and electric signature due to building material as well as state of the art sensor equipment, enabling it to track and attack long before it can be detected itself.¹⁷⁰ Due to Norwegian geography an invasion force will be dependent on sea-lift and the 212CD will be able to sink a significant part of this sea-lift with its torpedoes.

The potential threat of a submarine in an area will tie up the enemy's forces and give own forces increased freedom of movement. Anti-submarine warfare (ASW) is very resource demanding and the greatest threat to a submarine is airborne assets. Equipped with IDAS¹⁷¹, submarine launched anti-air missiles (IRIS-T¹⁷²), the 212CD has mitigated this threat.¹⁷³ IDAS can also be used towards surface and land targets giving support to own forces,¹⁷⁴ especially special forces.

The 212CD will be able to insert and extract special forces covertly in a high threat area due to its low signatures.¹⁷⁵ Covert ISR can be conducted and with a network centric warfare capable communication the ISR data can be shared in real time as a force multiplier for own forces.¹⁷⁶

Traditionally in a submarine vs. submarine duel the submarine that first detects and fires against the other wins, meaning the one with the lowest signatures and best sensors are most successful, and I, as a submarine expert, assess that the 212CD will be superior to Russian submarines in this context.

Due to the high survivability the submarine has the opportunity to retaliate against an adversary's shipping lanes and maritime assets well into a conflict.¹⁷⁷

Norway will be able to deploy one 212CD on continuous patrol in an area through the life cycle with four submarines balancing maintenance, training and deployment.¹⁷⁸ This

¹⁶⁹ Zagare and Kilgour. *Perfect Deterrence*, p 289

¹⁷⁰ <https://www.thyssenkrupp-marinesystems.com/en/hdw-class-212a.html>

¹⁷¹ IHS Jane's Weapons, *Naval 2012-2013*, p 138

¹⁷² IHS Jane's Weapons, *Air-Launched 2013-2014* (IHS 2013), p 14-17

¹⁷³ ThyssenKrupp Marine Systems, IDAS <https://www.thyssenkrupp-marinesystems.com/en/missile-system-idas.html> 2018 (Accessed 6 February 2018)

¹⁷⁴ Naval Today, HNoMS Uredd first Norwegian submarine to fire IDAS missile, <https://navaltoday.com/2016/06/02/hnoms-uredd-first-norwegian-submarine-to-fire-idas-missile/> 2016 (Accessed 5 February 2018)

¹⁷⁵ <https://www.thyssenkrupp-marinesystems.com/en/hdw-class-212a.html>

¹⁷⁶ Ibid

¹⁷⁷ Andersson J. J. (2015) Submarine Capabilities and Conventional Deterrence in Southeast Asia, *Contemporary Security Policy*, 36:3, p 475

¹⁷⁸ Ibid p 478

guarantees at least one surviving submarine even in case of a strategic first strike attack against naval bases. Operational patrols, training and exercises to show credibility is the closest one gets to actual use of force in peace-time.¹⁷⁹

In a defence/obstacle context we can conclude that the 212CD due to its stealth, armament, communication and sensor capabilities and the patrol cycle, having a retaliation¹⁸⁰ possibility, result in positive contribution to the credibility of a deterrence threat.

4.2.3 Dedication

The approved investment cost for the new submarines is 41.4 billion NOK and the project is dwarfed only by the F-35 procurement when it comes to Norwegian defence investments.¹⁸¹

Submarines are among the most complex man-made machines in the world and a submarine service is extremely challenging to operate, service and maintain due to the high skills and know-how required,¹⁸² however these are present in Norway hence it has had a continuous submarine service for more than 100 years. This will continue with the 212CD and both updated training and maintenance facilities are part of the project.¹⁸³

Through a strategic cooperation saving investment and life cycle cost and choosing a proven design built by an experienced submarine manufacturer, Norway secures continuous submarine operations, even in the period when the Ula-class will be decommissioned.¹⁸⁴

The economical commitments to the 212CD project and prioritising operational availability through maintenance, training and manning shows a clear defence dedication. Not allowing submarine patrols to be dormant while introducing a new submarine-class shows the importance Norway put on its submarines. By having a strategic agreement with Germany, the Government shows a clear motivation to improve the political, military and financial relations with key NATO allies. This leads to the new submarine project creating a dedication with a positive impact on a credible deterrence.

4.2.4 Alarm-bell/Trip-wire

The 212CD's capability to conduct covert ISR can provide Norway with an early warning of an imminent attack. This will give the Norwegian Government a possibility to increase readiness across the forces as well as seek early international support.

The IDAS missile can be launched against surface vessels, providing a soft kill option, stopping with minimum casualties compared to a target sunk by a torpedo and secure the option of a gradual escalation of a conflict.¹⁸⁵

A successful attack on a 212CD will result in the loss of the entire crew, create world-wide media attention and be interpreted by Norway and most likely NATO as an act of war. Further attacks on bases and maintenance facilities may run the risk of dragging our strategic partner

¹⁷⁹ Morgan, *Deterrence Now*, p 102

¹⁸⁰ Zagare and Kilgour. *Perfect Deterrence*, p 291

¹⁸¹ Norwegian MOD, *Prop. 123 S*, p 6

¹⁸² Andersson, *Submarine Capabilities* p 478

¹⁸³ Norwegian MOD, *Prop. 123 S*

¹⁸⁴ *Ibid*, p.6

¹⁸⁵ ThyssenKrupp Marine Systems, IDAS <https://www.thyssenkrupp-marinesystems.com/en/missile-system-idas.html> 2018 (Accessed 6 February 2018)

Germany into the conflict hence German submarines under maintenance or deployed in Norway might be destroyed as well as German lives lost and demands “an-eye-for-an-eye”¹⁸⁶.

The risk of being detected by the 212CD ISR capabilities and the resources needed to hunt it and the consequences attached with attacking Norwegian submarines leads to the conclusion that the submarine project contributes to strengthen the deterrence credibility threat by acting as an alarm-bell/trip-wire in case of an attack on Norway.

4.3 Conclusions

A deterrence threat must be capable and credible. Capability means a threat hurt and credibility means it can be rationally believed.¹⁸⁷ The analysis of the F-35 resulted in three positive contributions (capability, dedication, alarm-bell/trip/wire) and one negative contribution (defence/obstacle) to a capable and credible deterrence threat. The F-35 is a very capable weapon system and shows a clear Norwegian defence dedication and could act as a trip-wire if an attack occurred. There are however three issues within the project that challenge the credibility of the threat:

1. It can be perceived as a first strike offensive weapon system
2. The majority of the aircrafts will be concentrated on one airfield
3. The short endurance of high readiness and continuous operations

These three issues undermine the credibility of the F-35 to such an extent that the F-35 is a capable deterrence threat, however, until the three issues are mitigated, with a limited credibility. These shortcomings in the credibility of the F-35 system weaken the deterrence potential to a level that one cannot be sure if the F-35 contributes or not to a capable and credible strategic deterrence for Norway.

The analysis of the 212CD resulted in all four indicators giving a positive contribution to a capable and credible threat, given that Norway maintains technical and operational availability of the fleet to provide one submarine on continuously patrol.

In total, the conclusion is that one of the two strategic military capability procurement projects clearly contribute, the submarine project, but it is unclear from this study if the F-35 with its credibility flaws really contributes to a credible and capable deterrence. There is a paradox in that cost saving decisions to ensure operational availability which increases credibility also make the weapon systems more vulnerable and less credible due to lack of redundancy in for example main bases as identified in the F-35 project.

¹⁸⁶ Zagare and Kilgour. *Perfect Deterrence*, p 296

¹⁸⁷ Ibid p 289

5. Discussion

The Norwegian Armed Forces' primary mission is to maintain a credible deterrence and prevent armed conflicts arising, secondary defend Norway and allies against armed military aggression.¹⁸⁸ This demands that the strategic weapon systems F-35 and 212CD are both capable and credible, as well as not vulnerable to a surprise attack. If Norway had chosen a modernised 4th generation American fighter instead of F-35, an adversary would be less likely to perceive it as a first strike weapon as well as keeping the trans-Atlantic commitment. Given the same investment and life-cycle cost, this would allow a higher number of aircrafts, several bases and more ground-based air defence.

A fleet of just four submarines secures one boat on continuous patrol, however it would not provide any redundancy as well as given a submarine's low transit speed be limited to one area at the time. Increasing the fleet to six, would increase the operational availability to a degree where two submarines could be on continuous patrol at any time, making the deterrence threat a lot more credible. This forward deployment is also in line with Rhodes' recommendation in conventional deterrence.¹⁸⁹

There is a possible synergy between the two weapon systems due to their NCW capable communication system where one could act as the sensor and the other as the shooter, however tactics needs to be developed and analysed to determine if it's a rational use of military resources.

The possible imbalance between investment in the different services has not been covered in this study, however it looks like the land forces suffers in monetary terms while the Navy and Air-force gets the majority of funding. To maintain territorial integrity, you need boots on the ground and deterrence can only work if it is credible in all dimensions.

5.1 Personal Reflections

Zagare and Kilgour do not really bring anything new to the table, they even point it out themselves,¹⁹⁰ it's more a new path to reach their conclusion and they have strengthened the case for the importance of capable and credible deterrence threats.

During the research for this study I discovered that there is a clear distinction between unclassified data and public available data from reliable sources. This was mitigated by trying to avoid digging into technical specification and keeping the study on a general level since this is not a study of military technology as such. Further on, where more data was unavailable in official sources and secondary sources had to be used, the data were cross-checked, if possible, with other secondary sources. Finally, I did a mental credibility check relying on extensive experience as a navy and submarine officer to assess the validity of the data.

5.2 Further Research

This study is very limited and only looks at two Norwegian military capabilities in a deterrence context. I would recommend that a study of the deterrence potential of the whole inventory of the Norwegian Armed Forces could be conducted leading to a conclusion on Norwegian

¹⁸⁸ Norwegian MOD, *Prop. 1.S*, p 13

¹⁸⁹ Rhodes, *Conventional deterrence*, p 250

¹⁹⁰ Zagare and Kilgour. *Perfect Deterrence*, p 307

conventional deterrence. This would be a large study, however it could be split into studies looking at the five separate services, land, air, navy, cyber and SF, to make it more manageable. Further on, the distribution and possible imbalance of the defence investment portfolio's impact on deterrence is worth a study.

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