### *Directions to the student:*

### *Complete this form after you identify your intended thesis topic and thesis advisor. When you and your advisor are satisfied with your completed form, print the form to hardcopy or pdf [Pdf works best if faculty involved is not local or otherwise frequently travel], and submit the form to your advisor, co-advisor and/or 2nd reader (note only two faculty members are required here) for their signatures. Submit the form to the Ed. Tech only after advisor & co-advisor/2nd reader have signed it (She will route it further).*

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| Thesis Proposal Approval Form | | | | |
| **Student’s Name:**  **Xisen Tian** | | | **Home Phone:**  **360-314-7747** | **E-mail:**  **xisen.tian@nps.edu** |
| **Curriculum no.**  **⌧ 590, 🞏 591, 🞏 525, 🞏 533, 🞏 (other) \_\_\_\_** | | | **Degree:**  **MSEE** | **Date of graduation:**  **SEPT, 2020** |
| **A. Tentative Thesis Title:**  **Generative Adversarial Network for Deep Fakes in Radar Detection** | | | | |
| **B. Thesis Advisor:**  **Dr. John Vincent Monaco** | | | | |
| **C. Thesis Co-advisor:**  **CDR Chad Bollman** | | **D. Thesis Second Reader:**  **Carson McAbee** | | |
| Plagiarism/Cheating ⮚ The student needs to be aware of the fact that the thesis represents the work of the author alone. It is the student’s responsibility to ensure that material taken from other sources is acknowledged appropriately.  ⮚ The student will be familiar with the NPS Honor Code Instruction ([NPSINST 5370.4C](https://my.nps.edu/documents/104100045/106264659/NPSINST+5370.4C+Academic+Honor+Code.pdf/f0c852cf-dfc4-4b29-b3b5-cd80f560a0e3)) and the [ECE Information handout about plagiarism and cheating](http://www.nps.edu/documents/103424449/104623711/Information+on+Plagiarism+and+Cheating/39ae2a94-6b41-4550-8cdf-ab509544bfa6).  ⮚ By submitting this thesis approval form, the student acknowledges having read, understood and agreed to abide by the guidelines specified in the above documents. | **Thesis Extensions: (please, read)**  ⮚ A student who detaches from NPS before completing his/her thesis for the master's degree will be granted an extension of one year upon submitting the thesis extension request form.  ⮚ A student may apply for up to two additional one-year thesis extensions. Requests for these extensions are initiated by the student and should include a progress report, endorsement from the thesis advisor and any other relevant information. Students are reminded that requests for 3rd thesis extension will be granted only if the student has made SIGNIFICANT progress towards completion of the thesis, as certified by their thesis advisor.  ⮚ **The student bears full responsibility for maintaining the viability of his/her candidacy.** If a student's extension expires, the candidacy lapses and the degree cannot be awarded at any time in the future.  ⮚ **Students must complete their thesis requirements within 3 years of the date of detachment from the School.** | | | |

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| --- | --- | --- |
| **Advisory committee** | **Signatures** indicate approval of this thesis proposal as described in sections A through I of this document. | **Date**  (not required if signed electronically) |
|
| Advisor |  |  |
| Co-advisor/2nd reader |  |  |
| Academic Associate |  |  |
| Department Chair |  |  |
| Noted/Date: | Program Officer | |

### *The italics text shown in Sections E-I below is guidance for you.*

### *Delete italics text before submission for approval and signature.*

### E. Discussion of Topic

*This section should describe the main thrust of the study: What the specific objectives of your proposed thesis research are; What areas will be specifically investigated and what areas will be excluded. Put boundaries around the study; Identify what the study will be (e.g., a computer simulation, an experiment, an electronic design and implementation, a system study). Discuss any limitations of the study.*

This study will apply computer vision and machine learning techniques to create deep fake radar imagery that are indiscernible from real imagery. The study will be broken into four phases: 1) De-encoding and extraction of video from Furuno message traffic. 2) Generate a target detection model 3) Use a Generative Adversarial Network (GAN) to remove or reconstruct a scene around the target. 4) Test the model on various types of targets at various ranges and conditions.

### F. Tentative Chapter Outline

*This section should list tentative chapter headings and provide a brief discussion of chapter content. (Note: This can change).*

1. Abstract
2. Introduction and Motivations
3. De-encoding and extraction of video from Furuno message traffic.
4. Target detection model
5. Generative Adversarial Network (GAN) Construction
6. Real World Testing
7. Results
8. Discussion
9. Conclusion
10. Future Work
11. Bibliography

### G. Benefit of Study

*This section should present the contribution expected from research efforts, what individuals/organizations may be expected to use the results of the thesis (if known) and what problems/issues will be addressed/resolved.*

The 2016 elections drew attention to the powerful ramifications of a successful misinformation campaign. From fake news to deep fake audio and video recordings, deception can come in many forms today. The same machine learning capabilities developed in 2014 by Goodfellow et. al. that gave rise to deep fakes are raising the technological floor for military deception. This study will investigate applying deep fake machine learning techniques to the realm of electronic warfare: specifically, radar masking and false track injection.

### H. Preliminary Bibliography

*This section should include a listing of representative materials consulted during preliminary literature search. This should include references to the problem or issue to be studied, prior thesis work, literature references, or other sources of information. The final bibliography will probably be much more extensive.*

### I. Milestones

*This section should include a tentative list of target dates for completion of the successive stages of the project. You will not be held strictly to this schedule; it is a means of conveying to others when major milestones of the study are expected to be completed. The list should include dates during which the following activities are expected to be accomplished:*

*1. Literature Review 2. Construct Research Approach*

*3. Conduct Research/Travel 4. Analyze Data*

*5. Draft Thesis 6. Final Thesis Submission/Signature*