Chapter Two Appendix

Enclosure 2.11
Documents related to the Chief of Naval Personnel Direction for 65% /35% Technical/Non-technical Majors

Executive Summary-Update of USNA Implementation Plan to achieve 65% of USNA Graduates in STEM Majors

With Attachments

1. CNP memo on Academic Major Policy for Scholarship Midshipmen

2. USNA Superintendent Academic Major Implementation Plan

3. STEM 65% Target Data

4. USNA Commissioning Continuum with STEM Decision Points

5. Planned and Implemented Actions to Achieve 65% of USNA Graduates in STEM Majors

ENCLOSURE 2.11
Executive Summary: Update of USNA Implementation Plan to achieve 65% of USNA Graduates in STEM Majors

In August 2007 USNA received a memorandum from then Chief of Navy Personnel Vice Admiral Harvey stating, "Effective for midshipmen entering fall 2009 as members of the Class of 2013, USNA and NETC will respectively ensure a minimum of 65 percent of Navy-option USNA midshipmen and NROTC Scholarship Program midshipmen complete a technical degree program before receiving a Navy commission." (Attachment 1: N1/127175). In December 2007 an Academic Major Implementation Plan was signed out by then Superintendent Vice Admiral Fowler that outlined the USNA Implementation Plan to achieve 65% of USNA Graduates in STEM Majors, Attachment 2. The purpose of this summary and its Attachments is to provide an update on the 2007 Implementation Plan.

While the Class of 2011, which entered in 2007, is predicted to have approximately 60% STEM majors, due to a variety of actions that have been undertaken in the three years since 2007, the classes of 2012 and 2013 are predicted to have 66% and 64% STEM majors, respectively, Attachment 3. This anticipated improvement of about 5% has been the result of efforts to implement the actions presented in the 2007 Implementation Plan including (1) developing relationships that provide additional motivated, qualified candidates from technical high schools, (2) encouraging unsuccessful candidates to enroll in STEM courses at another college and reapply, (3) requiring plebes to include a technical major among their top three choices for a major and then encouraging them to choose a technical major through briefings and open-houses, (4) emphasizing project-based and other experiential learning such as STEM-related internships, (5) strengthening the Class of 1963 Center for Academic Excellence to support midshipmen in STEM disciplines, and (6) developing approaches to offer LREC opportunities to STEM majors.

Additional actions are being considered or have already been put into place for the classes of 2014 and beyond based on the Commissioning Continuum shown in Attachment 4. For example, at *Admissions*: the Admissions process has changed in that the Board awards extra points to the Whole Person Multiple to candidates who have demonstrated engagement in STEM in high school; expressed interest in a STEM major is now a selection criterion for those candidates recommended for both NAPS and the Foundation as well as college applicants; and a STEM predictor was developed to guide the admissions process.

During their *47-months*: a letter has been drafted to qualified STEM candidates that points out that a change to a STEM major remains a possibility; a process for carefully scrutinizing requests for transfer out of STEM majors is being discussed; resources are being sought to provide even more academic support and personal encouragement regarding STEM; and ways are being explored to engage upper class women and minority midshipmen, junior officers and influential faculty members in counseling and mentoring Plebes and Youngsters relative to STEM.

At *Service Assignment*: discussions are being held with the gaining communities to determine if there are ways to enhance the influence of a STEM major in the Service Assignment process.

Attachment 5 contains brief descriptions of these actions and, where appropriate, their related pros and cons. Working with those responsible for developing and implementing these actions, the Academy Effectiveness Board will closely monitor and assessment their efficacy once implemented.

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Attachment 1. Chief of Navy Personnel memo on Academic Major Policy for Scholarship Midshipmen

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, D.C. 20350-2000

1530
Ser N1/ 127175
19 Oct 07

MEMORANDUM FOR SUPERINTENDENT, UNITED STATES NAVAL ACADEMY
COMMANDER, NAVAL EDUCATION AND TRAINING COMMAND

Subj: ACADEMIC MAJOR POLICY FOR SCHOLARSHIP MIDSHIPMEN

Ref: (a) SECNAV memo of 10 Aug 07

1. Per reference (a), SECNAV has delegated authority to the Services to establish academic major policy to better enable capability to meet specific Service needs. The Navy needs an officer corps rooted in a strong technical foundation. Therefore, the Navy will use this authority to align academic major policy for United States Naval Academy (USNA) and Naval Reserve Officer Training Corps (NROTC), improve the technical competencies of its officer corps, and enhance our ability to meet the Navy's future needs.

2. Effective for midshipmen entering fall 2009 as members of the Class of 2013, USNA and NETC will respectively ensure a minimum of 65 percent of Navy-option USNA midshipmen and NROTC Scholarship Program midshipmen complete a technical degree program before receiving a Navy commission. To facilitate execution of this policy, please provide your proposed implementation plans and business rules to me not later than 14 December 2007. Plans should include a listing of majors evaluated to be Engineering Technical, Non-Engineering Technical and Non-Technical, and address the approach for side-loading two and three year scholarships to maximize production of technical degree graduates. Methods to appropriately categorize new majors must be included in the business rules developed to implement this policy. While recognizing the uniqueness of USNA and NROTC undergraduate programs, USNA and NETC shall coordinate their business rules to ensure commonality where practical.

3. USNA and NROTC midshipmen pursuing a technical major who wish to select Marine Option should be permitted to do so consistent with the allocation presented in the USNA/NROTC Strength and Inventory Letter and the individual midshipman's preferences. Navy-Option Academic Major policy should not be misconstrued to prevent a USNA or NROTC midshipman from selecting USMC by virtue of his or her academic major.

4. N13 point of contact for Scholarship Midshipmen Academic Major policy is LCDR Melissa Short, USN, OPNAV N131E3 at, (703) 693-2328/DSN 223 or email at nxag_n131e3@navy.mil.

J. C. HARVEY, JR.
Vice Admiral, U.S. Navy
Deputy Chief of Naval Operations
(Manpower, Personnel, Training
and Education) (N1)

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Enclosure 2.11

Attachment 2. USNA Superintendent Academic Major Implementation Plan

DEPARTMENT OF THE NAVY
UNITED STATES NAVAL ACADEMY
121 BLAKE ROAD
ANNAPOLIS, MARYLAND 21402-5000

1530
2-94
DEC 14 2007

From: Superintendent, U. S. Naval Academy
To: Chief of Naval Personnel

Subj: ACADEMIC MAJOR IMPLEMENTATION PLAN

Ref: (a) Chief of Naval Personnel memo ser N1/127175 of 19 Oct 07

Encl: (1) USNA Implementation Plan to Achieve 65% of USNA Graduates in STEM Majors

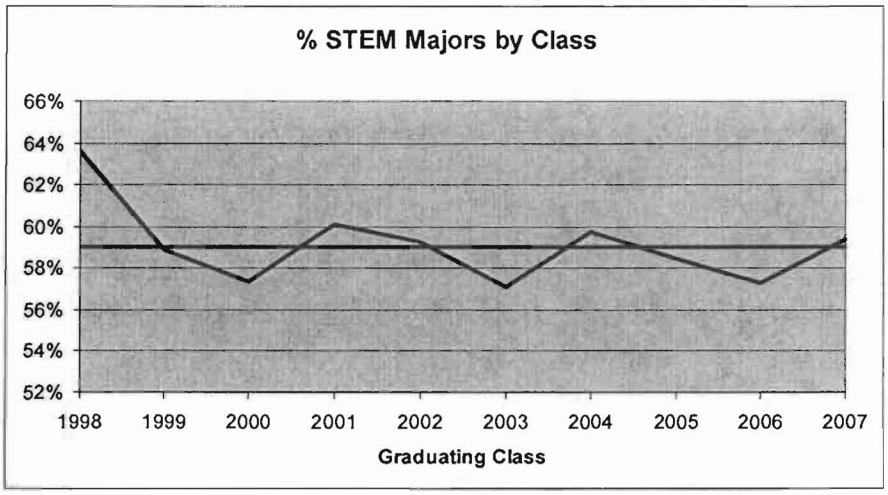
1. Summary. Reference (a) directed that "Effective for midshipmen entering fall 2009 as members of the Class of 2013, USNA and NETC will respectively ensure a minimum of 65 percent of Navy-option USNA midshipmen and NROTC Scholarship Program midshipmen complete a technical degree program before receiving a Navy commission." Reference (a) further directed that implementation plans be provided to the Chief of Naval Personnel by 14 December 2007. This letter responds to that direction.

2. General Background. Implementation of this new policy at the Naval Academy will require a different approach than within the NROTC program, because the Naval Academy seeks to commission all of its graduates, rather than a small fraction of the total student body. Consequently, the USNA implementation plan must incorporate consideration of whom the Academy recruits and admits, what academic programs are offered, the number of faculty members employed in and physical capacity of technical disciplines, how the midshipmen are advised prior to their selection of academic majors, and the level of support afforded to help midshipmen successfully complete their academic majors. In addition, the public documents describing the Naval Academy program to prospective candidates, such as the USNA internet homepage and the USNA catalog, must be updated to inform candidates for admission that no fewer than 65% of graduates will be required to complete academic majors in Science, Technology, Engineering or Mathematics (STEM) disciplines.

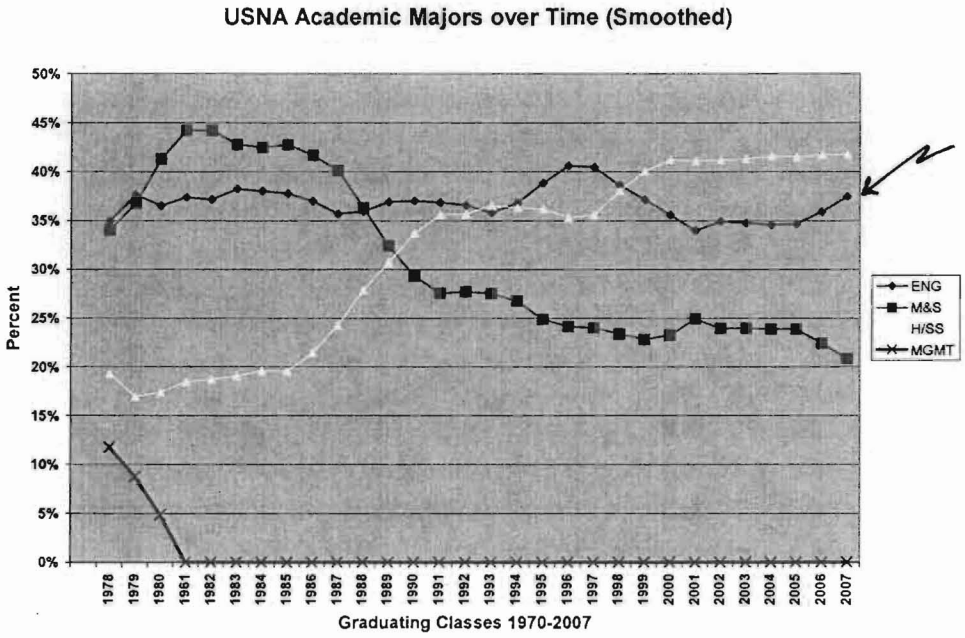
3. Navy and Marine Corps Graduates. Because USNA midshipmen select their academic majors in their midshipman fourth class (freshman) year, but do not express their preference for commissioning in the Navy or Marine Corps until their midshipman first class (senior) year, the new policy directing that 65% of graduates complete academic majors in STEM disciplines before they are commissioned into the Navy must be applied to the entire graduating class, Navy and Marine Corps. Information on service selection is not available early enough in midshipman four-year programs to make a difference in management of academic majors.

4. Previous Graduates. Analysis of the academic majors of USNA graduates over the last three decades illuminates some facts that will prove important in developing and implementing a strategy to achieve 65% of graduates in STEM majors for the Class of 2013 and subsequent classes.

a. Over the last decade (1998-2007) approximately 59% of USNA graduates have completed Science, Technology, Engineering, or Mathematics (STEM) majors.

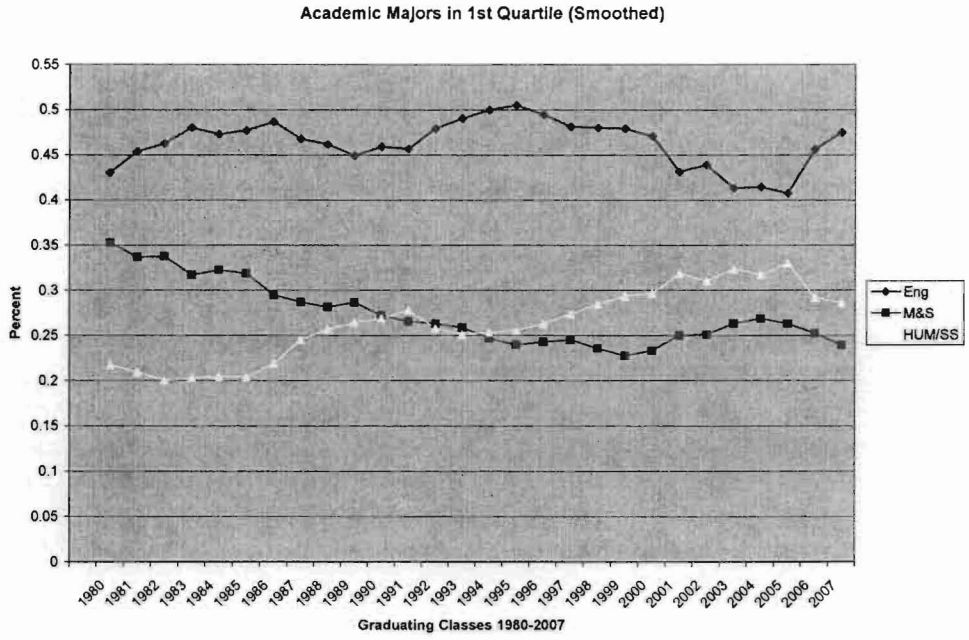


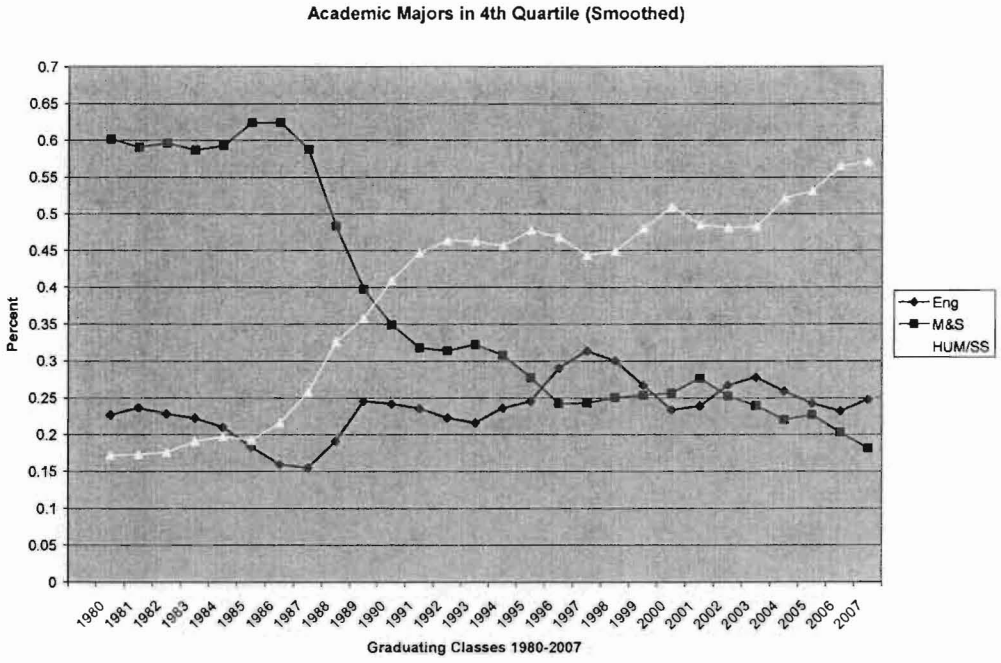
b. Over the last 30 years (1978-2007), approximately 37% of USNA graduates in each class have majored in Engineering, while enrollment in Math & Science majors and Humanities & Social Science majors have changed markedly. Various versions of Management majors that had been offered in the 1970s were terminated after the Class of 1980. (In order to better highlight long-term trends, each data point in the next three graphs is an average of the current year, the previous year and the following year's data.)



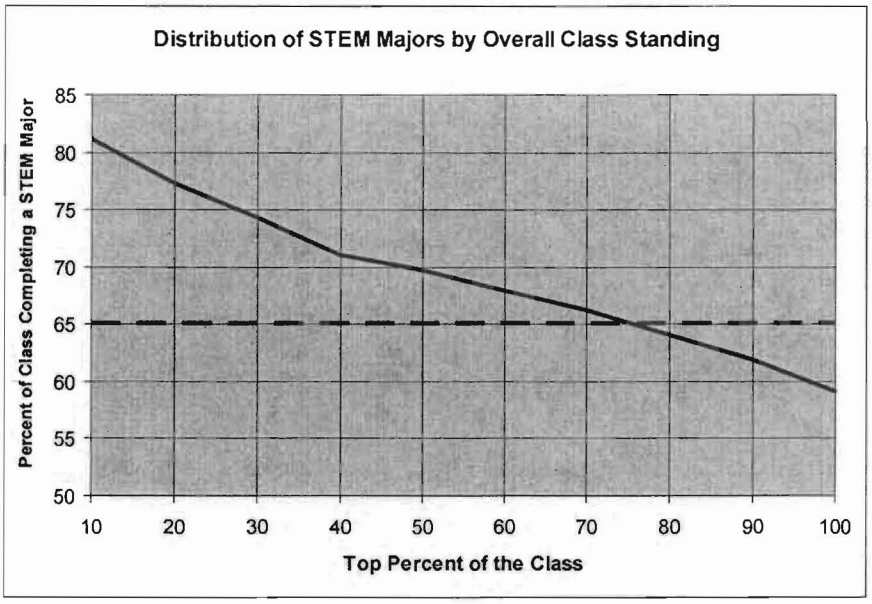
note that engineering vice "technical" majors have remained relatively constant. JG

c. It is noteworthy that previous direction to achieve a specified percentage of technical majors had its primary impact on shifting the weaker students between Math & Science majors and Humanities & Social Science majors. This is best seen by comparing the distribution of majors over time among the highest performing midshipmen (the 1st quartile in overall order of merit) and the distribution of majors in the bottom 25% of graduating classes (the 4th quartile in overall order of merit) for the classes of 1980-2007. In the 1st quartile, enrollment trends by academic major group (Engineering, Math & Science, Humanities & Social Sciences) do not show the same dramatic shifts in midshipman enrollment seen in the bottom quartile, in which lower performing students increasingly enrolled in Humanities & Social Science majors after the less rigorous Physical Science major was phased out in the latter half of the 1980s.





d. Currently, midshipmen graduating near the top of their respective classes in overall order of merit predominantly complete STEM majors. For example, considering the most recent graduating class, the Class of 2007, depicted in the following graph: 75% of the 1st quartile, 70% of the top half, and 65% of the top 3 quartiles completed STEM majors.



5. DON Language, Culture and Diversity Initiatives. In developing an implementation plan to comply with reference (a), USNA assumed that the Department of the Navy emphasis on providing regional and cultural education for all midshipmen will continue unabated for the foreseeable future. Similarly, USNA assumed that DON emphasis on increasing the percentage of officers commissioned with significant language abilities and on increasing the diversity among naval officers will proceed undiminished by this new academic major policy.

6. Resources. The Naval Academy's implementation plan will ensure that 65% of USNA midshipmen in the graduating Class of 2013 and subsequent classes complete academic programs in rigorous, credible STEM majors prior to receiving their commissions; but successful implementation of this plan will depend in large measure on the Navy providing the additional resources required to implement the initiatives delineated in that plan.

7. Action. The Naval Academy's implementation plan in response to reference (a) is provided at enclosure (1).

J. L. Fowler

Copy to: 1. Chair, USNA Board of Visitors
2. Deputy Commandant (M&RA), HQMC

USNA Implementation Plan
Achieving Not Less Than 65% STEM Majors
Among Navy Graduates, Classes of 2013 and Beyond

1. Planning Foundation

a. Academic majors currently offered at the Naval Academy are:

Engineering

Aerospace Engineering	Mechanical Engineering
Computer Engineering	Naval Architecture
Electrical Engineering	Ocean Engineering
General Engineering	Systems Engineering

Mathematics & Science (Non-Engineering Technical)

Chemistry	Mathematics
Computer Science	Oceanography
General Science	Physics
Information Technology	Quantitative Economics

Humanities & Social Sciences (Non-Technical)

Arabic	English
Chinese	History
Economics	Political Science

b. Over the last 4 years the percentage of a graduating class enrolled in Science, Technology, Engineering and Mathematics (STEM) majors has dropped by approximately 4-7% between initial selection and graduation as a result of midshipmen leaving the Academy and changes in individual midshipman academic majors.

c. In order to ensure that 65% of the midshipmen in a given graduating class have completed STEM academic majors by the time the class graduates, the Academy has established a goal of enrolling no fewer than 70% of the Class of 2013 and subsequent USNA classes in STEM disciplines at the time of major selection.

d. USNA will implement many of the revised processes described herein as pilot projects with the currently enrolled plebe Class of 2011 and in recruiting and admitting the Class of 2012. The results of these pilot projects will provide valuable data regarding the efficacy of changes planned to increase the percentage of future classes who select academic majors in STEM disciplines.

2. Business Rules

a. Midshipmen fourth class (Plebes) must provide their top 2-4 prioritized choices for academic majors when selecting academic majors, AND at least one of the first two choices must be in a Science, Technology, Engineering, or Mathematics (STEM) discipline.

b. If fewer than 70% of a particular class of USNA midshipmen choose academic majors in STEM disciplines, selected midshipmen fourth class, predominantly from the middle of the class (2nd and 3rd quartiles) whose first choice of academic major was in a non-STEM discipline and who appear to have the talent and mathematical aptitude to succeed in a STEM academic major, will be counseled to encourage them to change their major to one in a STEM discipline. In general, the 2nd and 3rd quartiles of a class represent the largest population of academically accomplished midshipmen who may be good candidates for transferring to a STEM major.

c. If new academic majors are introduced into the USNA program under this implementation strategy, they will be designed consistent with the following criteria. New academic majors in engineering offered at the Naval Academy will be designed to be consistent with the national criteria for accrediting engineering academic majors, as administered by ABET (formerly the Accreditation Board for Engineering and Technology). New academic majors in Mathematics and Science will include at least 14 courses (42 semester credit hours) supporting the discipline-specific knowledge in the new major, and the preponderance of those courses must be in mathematics and science disciplines. These credit hours for academic majors in Mathematics and Science will be in addition to credit hours earned in the USNA courses required of all midshipmen, and generally will not include a requirement for a foreign language. New academic majors introduced in the Humanities and Social Sciences will include at least 10 courses (30 semester credit hours) in courses supporting the new academic major discipline plus at least four semesters (12 semester credit hours) of a foreign language. Again, these credit hours supporting new academic majors in the Humanities and Social Sciences will be in addition to credit hours earned in the USNA courses required of all midshipmen.

3. Implementation Strategy

Initiatives to achieve the mandated 65% of Navy graduates in STEM disciplines beginning with the Class of 2013 will be considered in four categories:

Marketing
Admissions
Academic Programs
Academic Support & Counseling
Other Initiatives

The strategy described below will be modified, as necessary, after results with midshipmen in the classes of 2011, 2012 and 2013 are available.

4. Marketing

a. Develop relationships that could provide additional motivated, qualified candidates for the long-term future:

(1) Preferentially market to technical schools, high schools with technically related curricula and high college-going rate.

(2) Leverage "FIRST" and other technically oriented middle school and high school competitions to bring potential candidates to visit USNA.

(3) Seek to establish partnerships with ONR, NAVSEA and NAVAIR to sponsor and host at USNA a secondary school science fair, whose winners earn scholarships to college; use the events to recruit to USNA, NROTC and to the technical work forces in the SYSCOMs.

b. Ensure marketing materials highlight midshipman design-build team projects, midshipman laboratory and field research, and other exciting projects pursued by midshipmen in STEM majors.

c. Update the USNA catalog, the USNA internet web site and other recruiting materials to emphasize the Naval Academy's technically oriented curriculum.

d. Update training and support materials for Blue & Gold officers nationwide.

5. Admissions

a. Aggressively recruit candidates who receive a "letter of assurance" and who are inclined to choose an academic major in a STEM discipline. Ensure they receive a personal telephone call encouraging these candidates to choose USNA for their post-secondary education.

b. Modify the USNA standard "turn down" letter to encourage unsuccessful candidates to enroll in college in a STEM discipline and reapply for admission the following year.

c. Re-evaluate the "whole person multiple" calculated on every USNA candidate and determine whether any changes would increase the likelihood that admitted candidates would select academic majors in STEM disciplines.

6. Academic Programs

a. Re-emphasize project-based instruction in teaching engineering and the physical sciences.

b. Secure a reliable source of funding and adequate space for midshipman design-build engineering team projects.

c. Investigate, develop and possibly introduce:

(1) Industrial Engineering major

(2) Operations Research minor and/or major

(3) Leadership minor or Philosophy minor for midshipmen majoring in STEM disciplines

7. Academic Support & Counseling

a. Replace part-time, temporary (adjunct) instructors in STEM disciplines with full-time faculty in order to provide the academic counseling and instructional support that midshipmen in STEM disciplines require.

b. Strengthen the Class of 1963 Center for Academic Excellence in preparation for supporting increased enrollment in STEM disciplines.

c. Educate current midshipmen regarding the needs of the Navy and the command's responsibility to meet those needs.

d. Engage selected midshipmen currently majoring in STEM disciplines to assist academic advisors in informing midshipmen fourth class (plebes) regarding opportunities in their academic majors.

e. Counsel selected Economics (FEC) majors to switch to the Quantitative Economics (SQE) major.

8. Other Initiatives

In discussions with the Naval Academy faculty and academic leadership regarding how the Academy might ensure that no fewer than 65% of those USNA graduates commissioned into the Navy from the Class of 2013 and subsequent classes have completed academic majors in STEM disciplines, several other promising initiatives were suggested but have not yet been thoroughly analyzed. The following initiatives will be considered further and, if found to have significant merit, may be adopted at a later date:

a. Develop approaches to offering semester study abroad and cultural immersion opportunities to midshipmen majoring in STEM disciplines so that such opportunities are available to midshipmen in all majors. Otherwise, the existence of such stimulating opportunities for midshipmen in non-STEM disciplines to learn more about the nations and regions in which they will be engaged as officers will tend to incentivize midshipmen away from selecting academic majors in STEM disciplines.

b. Identify opportunities to get small groups of midshipmen fourth class (freshmen) into the Academy's science and engineering laboratories during the fall semester as another way to inform them of the opportunities to address challenging real-world problems as an integral component of an undergraduate STEM major.

c. Consider how the Naval Academy might attract midshipmen into academic majors in mathematics and science disciplines in spite of national trends for enrollment in these disciplines to decline.

d. Consider a suggestion that the Academy assign greater weight to midshipman performance in those courses required of all midshipmen when calculating an individual's overall order of merit in the graduating class in order to lessen possible midshipman concern that selecting an academic major in a STEM discipline might result in lower grades and a subsequent reduction in graduating class standing.

e. Consider alternatives for more closely linking a midshipman's academic major to his or her service assignment as a way of possibly incentivizing midshipmen to select academic majors in STEM disciplines.

f. Consider potential costs and benefits of the Naval Academy initiating and hosting an annual undergraduate STEM conference, analogous to the ongoing Naval Academy Foreign Affairs Conference, as an approach to sustaining midshipman interest in selecting an academic major in one of these disciplines.

9. <u>Resources Required to Implement Strategy</u>

a. (Comments consistent with USNA POM-10 input) USNA is at its enrollment capacity today for majors in electrical, mechanical, aerospace and systems engineering; there is no additional room available in classes taught by currently employed faculty members to support growth in the number of midshipmen majoring in these disciplines. Part of this capacity limitation results from the number of part-time, temporary (adjunct) instructors already teaching in the STEM disciplines. In general, adjunct instructors are not qualified to teach the more advanced courses in the discipline and are not available to provide midshipman academic support outside the classroom. USNA POM-10 submission requested 18 additional faculty members (corresponding to a dollar investment of approximately $2M each in MPN and O&M,N) in order to increase the number of engineering, science and mathematics classes taught by full-time faculty members at USNA. This growth in full-time faculty was projected at a ratio of 50% military and 50% civilian.

b. Expanded employment of project-based education in STEM disciplines is currently unfunded. Much of this activity today is funded philanthropically and the year-to-year availability of funding is unpredictable. To ensure a high probability of success for midshipmen in STEM disciplines, $500K should be allocated annually to support the cost of midshipman involvement in design-build and hands-on laboratory projects.

c. There has been no increase in educational space devoted to teaching STEM disciplines at USNA in more than 30 years, and the existing engineering building is in serious need of renovation. Over those three decades, broad-based research into teaching and learning methodologies has demonstrated that students learn STEM disciplines best when involved in solving hands-on, unscripted real-world problems. The Naval Academy needs more project space for the midshipmen today than when the current engineering building was conceived in the

1960s, and the existing engineering building needs renovation of its basic HVAC, plumbing and electrical systems. A related MILCON project is being proposed as part of POM-10.

d. If USNA expands its summer programs to attract more candidates interested in majoring in STEM disciplines, including potential candidates in middle school and early high school, additional resources must be available to support such programs. Current estimates are that an additional $400K for summer science/engineering recruiting youth camps at USNA is required.

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Attachment 3. STEM 65% Target Data

Enclosure 2.11 Attachment 3
STEM 65% Target Data

	Entire Class - Initially					Entire Class - Currently					US Navy Graduates				
Class	**E&W**	**M&S**	**H&SS**	**Total**	**% STEM**	**E&W**	**M&S**	**H&SS**	**Total**	**% STEM**	**E&W**	**M&S**	**H&SS**	**Total**	**% STEM**
2006	469	258	412	1139	63.8%	370	198	424	992	57.3%	287	172	322	781	58.8%
2007	463	302	392	1157	66.1%	392	226	425	1043	59.3%	311	187	322	820	60.7%
2008	460	289	429	1178	63.6%	375	268	414	1057	60.8%	308	215	295	818	63.9%
2009	467	264	430	1161	63.0%	364	237	460	1061	56.6%	275	186	328	789	58.4%
2010	479	251	442	1172	62.3%	379	231	424	1034	59.0%	292	181	300	773	61.2%
2011	421	289	433	1143	62.1%	310	277	450	1037	56.6%					
2012	495	354	373	1222	69.5%	411	321	407	1139	64.3%					
2013	468	348	394	1210	67.4%	448	320	419	1187	64.7%					

Over past 5 graduated classes:

average STEM loss of 5.2% from initial major choice to graduation.

USN STEM percentage is higher than the whole class by an average of 2.0%.

On average, there are 3.2% fewer USN STEM grads than the percentage of the whole class that initially selected STEM.

So, here are some guesses **2011** will graduate **58.9%** STEM into USN.

2012 will graduate **66.3%** STEM into USN.

2013 will graduate **64.2%** STEM into USN. <<

Chapter Two Appendix

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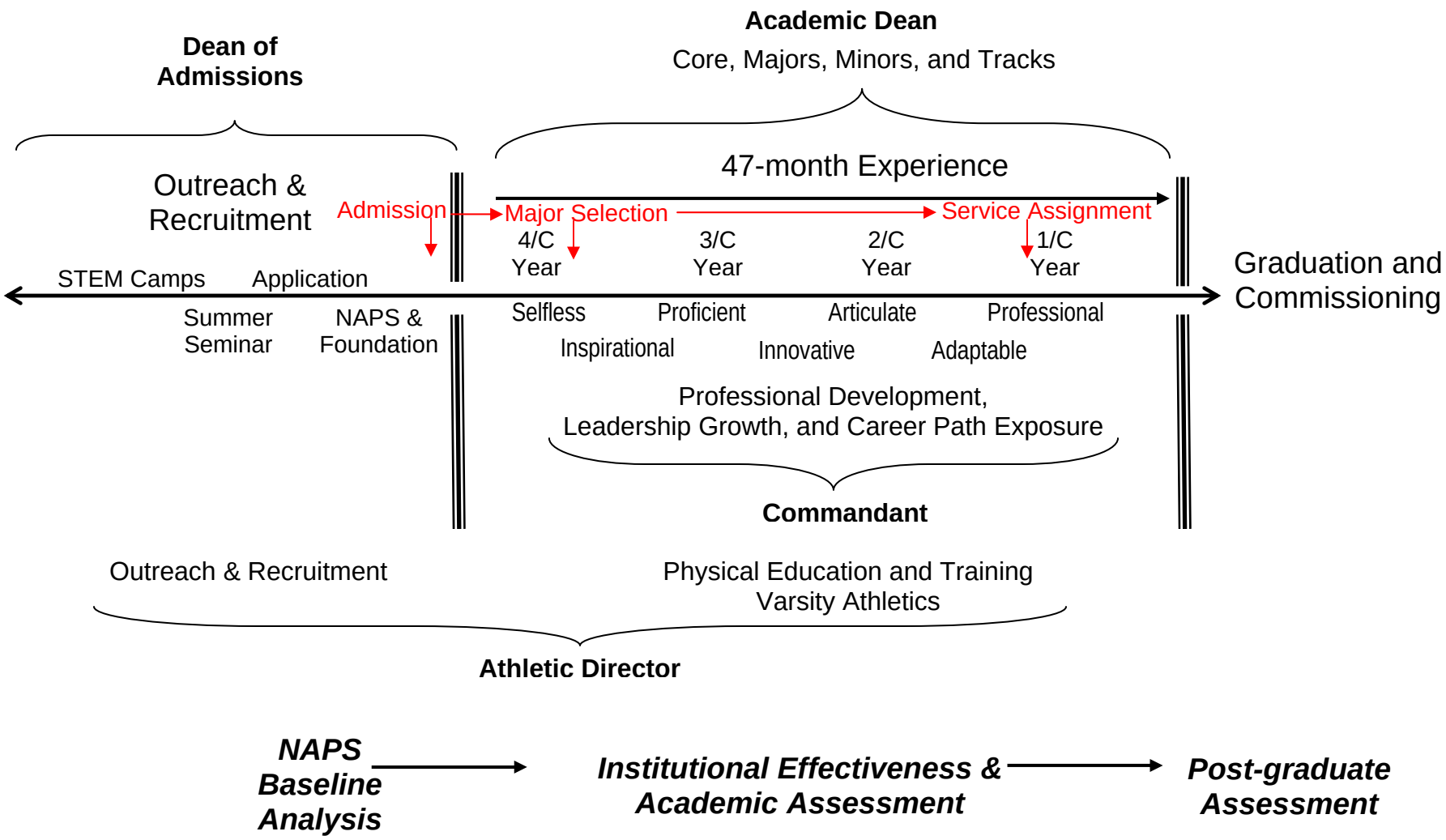
Attachment 4. USNA Commissioning Continuum with STEM Decision Points

USNA Commissioning Continuum
Implementation and Assessment
STEM Decision Points



NAPS Baseline Analysis → ***Institutional Effectiveness & Academic Assessment*** → ***Post-graduate Assessment***

Chapter Two Appendix

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Attachment 5. Planned and Implemented Actions to Achieve 65% of USNA Graduates in STEM Majors

Chapter 2 Enclosure 2.11
Attachment 5
Planned and Implemented Actions to Achieve 65% of USNA Graduates in STEM Majors
CoA 1. Admissions

CoA 1a. STEM Predictor.
A STEM predictor was developed by analyzing data from recently graduated USNA classes. The analysis compared candidate's major preferences, MSAT scores, and engagement in STEM activities in higher school with their majors at graduation from USNA. In addition, a review of the literature on college STEM majors was conducted. The resulting STEM predictor allows the Admissions Board to identify and track potential STEM majors in the Admissions process.

CoA 1b. Demonstrated STEM Activities.
Beginning with the Class of 2015, the Admissions Board has been awarding extra points to the Whole Person Multiple (WPM) for candidates who have demonstrated interested in STEM in high school (e.g., Chemistry award, robotics team, President of Science Club). The Admissions Board has been coding application files with a demonstrated interest in STEM activities in order to provide additional reviews throughout the Admissions cycle. These reviews have led to candidates being provided an offer of appointment or additional consideration as a wait list or foundation candidate at the end of the cycle.

CoA 1c. NAPS/Foundation (FDN).
Interest in STEM majors is now a selection criterion for those candidates recommended for both NAPS and the Foundation programs.

CoA 1d. College Applicants.
College applicants who are already in a STEM major or who have demonstrated an interest in a STEM major by taking STEM courses such as "Introduction to Engineering" receive additional consideration by the Admissions Board for direct admission.

CoA 2. Major Selection

CoA 2a. Provide personal support for potential GRP I & II women and minorities.
Outreach by female and minority JOs, upper-class STEM majors, and STEM faculty members to recruit plebes into STEM majors. This could be accomplished by engaging the Joy Bright Hancock group as well as various professional engineering ECAs in hosting meetings with plebes.
<u>Pros</u>: The Majors Focus Group Study found that these groups are the most influential in the major selection process.
<u>Cons</u>: Over-recruitment may influence some plebes to make choices inappropriate for them. Such aggressive recruitment may result in significant resistance by faculty in the Division of Humanities and Social Sciences.

CoA 2b. Business Rules-Change from Major *Selection* to Major *Assignment*.
Plebes are required to indicate three choices for major, at least one of which is a STEM major. In changing to Major *Assignment*, after plebes make their preferences known, they would be placed into majors so that the STEM percentage is sufficiently high to allow for the attrition that will occur over the next three years. This number has to be determined within the context of the new rules since it may well result in higher attrition than in the past. An explicit rule set about which

midshipmen will be placed into their STEM choice instead of their non-STEM first preference needs to be determined.
Pros: This would assure the Academy meets its goal and would be consistent with the current process used for Service Assignment.
Cons: Midshipmen forced into a STEM major who strongly prefer a non-STEM major would certainly be unhappy. Some of these midshipmen might transfer (voluntary attrition) or attrite for academic reasons. Some might deliberately underperform in the hope of being allowed to change to a non-STEM major. The attitudes of these midshipmen might not contribute to the spirit of the Brigade and could negatively affect the classes they attend. Since we do not know in 4/C which midshipmen will be commissioned into USMC at graduation, some of these plebes will be affected, too. Not allowing midshipmen their choice of major would certainly create a strong backlash in the non-STEM disciplines. It would also likely create problems for Admissions as candidates learn that they could not choose their majors but would be assigned to them.

CoA 3. Subsequent to Major Selection

CoA 3a. Restrict Transfers Out of STEM Majors.
Henceforth, requests for transfer out of STEM majors will be very carefully scrutinized and allowed for only those regarded by the ADAA, for example, to be incapable of managing the program in the major they freely selected. [Note: The most salient reason to allow midshipmen to transfer out of STEM majors is that they may have chosen a STEM major due to their inability to assess correctly their own capabilities. Requiring them to remain in STEM majors would likely result in failure and/or attrition.]
Pros: This would minimize the traditional transfer (about 5-6%) out of STEM majors.
Cons: It will result in unhappy midshipmen and will also make some in following classes wary about choosing STEM majors. It might result in higher voluntary and academic attrition. It may be difficult to develop fair criteria to distinguish between those who cannot manage a STEM major and those who can.

CoA 3b. Recruitment of qualified STEM candidates among current GRP III Majors
There are about 145 3/C non-STEM majors whose QPRs are at least 2.9 and who earned at least B grades in calculus and chemistry. An email would be sent to these *qualified* STEM candidates indicating that a change to a STEM major remains a possibility and describing how to go about making that change. (See Appendix: Note the two sentences in red font. They will be included only if approved by the Superintendent. One can imagine the different effects of the message with and without the sentence on a midshipman receiving it.)
Pros: This might result in a slight increase in STEM majors.
Cons: It will also likely result in significant resistance by faculty in the Division of Humanities and Social Sciences.

CoA 3c. Provide personal support for current GRP I & II women and minorities.
Engage female and minority JOs, upper-class STEM majors, professional ECAs, and STEM faculty members to mentor STEM majors.
Pros: This would provide ongoing support for women and minority STEM majors through the Joy Bright Hancock group as well as various professional engineering ECAs.

Cons: This could be seen as an over-emphasis on women and minorities and, therefore, unfair to majority midshipmen. Such a program may cause concern among faculty in the Division of Humanities and Social Sciences.

CoA 3d. Provide more academic support for STEM Majors and, in particular, key STEM Courses.
Continue to strengthen the Class of 1963 Center for Academic Excellence to support midshipmen in STEM majors and courses. Continue to work with STEM faculty to help them teach to a wide range of learning styles and academic backgrounds using experiential and project-based teaching and learning methods.
Pros: More academic support should result in increased STEM success.
Cons: Over emphasis on STEM could result in significant resistance by faculty in the Division of Humanities and Social Sciences.

CoA 4. Service Assignment (SA) Process

CoA 4a. Make a Midshipman's academic major a ***consideration*** for service assignment.
Academic major could be stipulated as an additional criterion to use in the whole person multiple schemes already being employed by the individual community boards that generate recommendations for service assignments.
Pros: This is already done for some communities (Nuclear Reactors, SWO-Options, CEC), and would be relatively easy to add to the Aviation and SWO community assignment board recommendation criteria. This might result in a slight increase in STEM majors.
Cons: The degree of influence of this action is unknown. It would not apply to USMC accessions, as per the CNO directive, which would create inequity across the Brigade. In the "whole person" concept being employed by the SA process, academic major selection would be a minor consideration, and it is unlikely that it would ever be the single deciding factor for midshipmen to not receive their preferred service assignment, which probably limits the influence this CoA would exert on individual behavior. In addition, there is over a two-year gap between major selection and service assignment, which may reduce the impact of this action.

CoA 4b. Make academic major a ***requirement*** for service assignment.
Establish quotas for each service assignment option that would mandate some percentage of those selected for each service assignment community to be STEM majors.
Pros: This would have an immediate and significant effect on academic major selection; most likely assuring that USNA meets the 65%/35% mandate.
Cons: It's unclear where the authority to mandate this rests. It most probably requires some direction from beyond the institution. It would make Service Assignment much more complex than it already is. Additionally, it would remove much of the flexibility that currently exists in the system which allows us to fit midshipmen in the communities where they'll have the best chance of succeeding and having an enjoyable and professionally rewarding career. This would be a draconian measure, and would likely result in unhappy midshipmen and create significant resistance by faculty in the Division of Humanities and Social Sciences. It will also be counter to the emphasis on LREC. In addition, it would not apply to USMC accessions, as per the CNO directive, which would create inequity across the Brigade. Such a situation would likely create significant unintended negative consequences.

Enclosure (5)

Appendix

Draft email message to about 145 youngsters in non-STEM majors who earned calculus and chemistry grades of at least B and a CQPR of at least 2.90.

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Dear Midshipman,

This note is to encourage you to consider changing your major to a STEM major, that is, a major in Science, Technology, Engineering or Mathematics. Your academic performance last year was good and, in particular, you earned good grades in chemistry and calculus. This leads me to believe you have the ability to do well in a STEM major.

Even though your academic program would not change this semester, it is probably not too late to change to a STEM major. If you are interested in pursuing this possibility, you should visit with the senior adviser or department chair in the STEM major of your choice, as soon as possible. That faculty member can help you decide if the change is feasible and how you could actually do it. The senior advisers are listed at http://www.usna.edu/AcDean/advisers/senioradvisers.html.

As you may recall from the major briefing for 2013 last January, the Naval Academy has been directed by the Chief of Naval Operations to produce 65% of its USN graduates from STEM majors. *At that briefing, I also told you that your major might be taken into consideration at the time of service assignment. In fact, the Superintendent will direct that STEM majors receive a measure of extra consideration in the service assignment process for the Class of 2013.* In short, ***the Navy wants and needs STEM majors***.

Frederic I. Davis, Ph.D.
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