

INTERVIEW SUMMARIES

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Air Force

Organization/Resources

The US Air Force (AF) had a robust long-range strategic planning process in the late 1990s, but after 9/11, it went into a short-term operational planning mode. There was less concern with what might happen 20-30 years out and a more exclusive focus on what was happening now. Around 2011/2012, it became clear that there would be a steady state of counterterrorism work as part of the AF's mission, but at the same time new threats and changes in their environment were emerging. Part of the AF's environment was becoming stable while another part of the environment was changing rapidly in negative ways. There was a recognition that while they had to continue with some of their current work, they also had to pay more attention to emerging developments and prepare for the future. This led to the re-emergence of foresight and strategic planning as important activities.

There is no specific budget devoted to foresight. The AF uses foresight work as an initial step in the strategy development process and incorporates it into its directorate responsibilities.

Foresight Methods

With multiple and diverse factors influencing their environment, the AF decided to conduct strategic foresight both in terms of future global trends and by scenario analysis. The AF felt this was the best way to identify core investments that needed to be made to fight any adversary they might face. In 2010, the AF published their initial *environmental scan* that laid out a very complex, dynamic, and diverse environment that the AF would be facing. This was updated in 2014 and 2016.

The AF previously conducted horizon scanning every two years. Now they are considering performing a major scan every four to six years with interim two-year scans to identify any major shifts. For the scan in 2012, a team of scanners was asked what they see as the most significant emerging issues for the AF. This team was created by having each of the 150 organizations within the AF identify their best person for the activity. All 150 were able to recommend issues using an online tool, but 40 enlisted officers and civilians were involved more intensively. Reducing the active pool of scanners to 40 people was largely done by self-selection as people assessed their own interest and the relevance of long-term planning to their organization. The process involved two face-to-face meetings, one at the start and one near the end, which were important for building the network and making people feel comfortable inputting information online and contributing to the scan.

A literature review was also conducted to identify emerging issues for the defense industry and national security. The internal strategic planning team then went through a binning exercise to

identify which issues identified by the team of 40 covered the same concepts. (For example: “miniaturization” as a trend encompasses various things such as nano-robotics and miniaturization of computers). The team then asked itself what underlying mega-trends they see in this binned smaller list. The goal was to identify a set of trends/factors that are core drivers to use in building scenarios.

Eight scenarios were developed for people involved in the scan to work with. Four of the scenarios judged most significant were used with one- and two-star commanders. The overall process was parallel to that used by the VA, with the *scan* producing materials for developing *scenarios*, the scenarios used to identify *imperatives* for being successful in the alternative future conditions and the imperatives used to derive *goals*. They recommend using four scenarios for this type of process.

Forward-Looking Time Frame

20 to 30 years.

Leadership Involvement

Support for foresight from the AF Chief of Staff, and the Secretary encouraged participation by senior staff in the scenario workshops. The AF has established a Strategy Board at the middle senior level (1-2 star generals and civilian equivalents). The Board will have an approval role in the review and publication of future AFSEA documents. Bringing in this level of leadership will give them earlier insight into the foresight process so that when they become the decision makers they can understand the assumptions about the future underlying the strategic decisions they are making.

Integration into Planning and Management Processes

Foresight results have fed directly into strategic planning and Quadrennial Defense Reviews in the past. The biggest challenge for the AF is linking strategic level guidance with resource decision-making. Foresight efforts culminate in strategic goals for what must be implemented to be successful in the future. Products and activities to achieve those goals can be identified, but those products/activities are generally described in such general terms that 100 different items can be funded that won't necessarily provide progress towards the goals. The AF is currently having strategists collaborate with programmers. The strategists describe goals and the programmers help identify how money can be spent to reach those goals. The AF has added a long-range planning function to provide a better linkage and translation of strategic goals into specific planning choices for senior leader consideration.

Conclusions and Broader Observations

Foresight in the Federal Government: Supplemental Information

Interest and involvement in strategic foresight has waxed and waned in the AF over time. The current OSD reorganization around regional threats has resulted in the AF moving their Strategy Development office. While the recent foresight efforts were successful, in retrospect the scenarios did not get to the level of revolutionary change needed to jolt the system. Making some scenarios far more challenging could have improved the process.

While foresight is important, how it will impact what the AF does is critical to developing an understanding of foresight. To improve understanding by all Airmen, the AF wrote an Air Force Future Operating Concept that discussed how the AF might operate in the future. The use of vignettes to increase understanding as well as being interesting to read has been of great value. The focus of 'how we might operate' helps to stimulate futures thinking.

The Air Force would be supportive of the development of a cross-agency foresight effort.

Bureau of Prisons - U.S. Department of Justice

Organization/Resources

The Bureau of Prisons (BOP) has had a forward-thinking effort since 2000. At its peak there was an appointed leader who dedicated about half an FTE working on foresight and there were as many as two FTE total involved. A training program has been a major feature of the foresight effort and in the past, it has had a budget of \$200,000. The overall annual funding of the program at its peak – training program plus salaries - reached approximately \$600,000.

Foresight Methods

Scenarios have been the most common foresight method used, with *scanning* as a part of scenario development and some use of Backcasting, a foresight method that starts by describing a desirable future and then works backwards to identify policies and programs that could lead from the present to that preferred future. Recently, from 2013 to 2016, brainstorming and Delphi processes/exercises have been used as part of Foresight Training during Annual Training to solicit foresight input from staff. Early in the program's existence, a decision was made to focus on training warden-level people. Groups of 40-50 people were brought together for training sessions on scenario development. Over time the program trained around 600 people.

A unique aspect of the BOP's approach was that at the end of each training session, groups of seven to eight participants formulated foresight-oriented projects and worked on them for 9-18 months. BOP executive staff read the reports produced on these projects. At the same time, every executive staff paper was required to include a forward-thinking narrative for what was being promoted and foresight staff could provide comments. The proposed initiative had to demonstrate that it was a step in the right direction with additional outlined steps forward for the next 10-20 years.

These efforts engaged a cadre of people in foresight and had some success in bringing foresight into decision-making. Many of the projects that came out of these training programs, however, were not well connected to expressed needs, and projects frequently were not completed. As a result, BOP refocused the program on "practical foresight." In its most recent effort, the foresight team decided to conduct six projects a year with warden-level staff and subject matter experts, to focus those projects on tangible steps to address expressed needs, and to set a six-month deadline for project completion.

Participants were asked to reflect on what worries them most about the prison system or frustrates them the most about the operation of the BOP. The group brainstormed well over 250 topics and after review by Assistant Directors involved with the BOP foresight efforts, presentation and review by Executive staff, six projects were selected. These included projects focused on prisoner wellness, preparing inmates to reenter the workforce, and improving training. Projects drew as much as

possible on emerging possibilities. In the project on training, for example, participants identified and discussed the processes that were leading to bad trainings, imagined the kind of improved training that might be possible in 20 years, and recommended changes they believe possible in the near future. The focus of the projects was to provide the BOP's executive board with ideas for a path forward. Project reports included timelines that outlined requirements and resources needed to reach the desired outcome.

Forward-Looking Time Frame

BOP scenarios typically portrayed alternative future conditions 5 to 20 years into the future.

Leadership Involvement

In the past, some junior and senior executive training programs were held and every proposed initiative had to have a foresight element. Products of the BOP's foresight projects are presented to senior leadership for their consideration and potential action.

Integration into Planning and Management Processes

There is a philosophical agreement within BOP that foresight should be linked with strategic planning but there is no formal process in place now to accomplish this objective. Foresight efforts only informally feed into the strategic plan. White papers are produced with hopes of influencing the plan. Enterprise risk management has not yet been integrated with foresight.

Conclusions and Broad Observations

BOP's foresight efforts are among the longest running in the government but are less extensive now than they were in the past. The concept of using scenario exercises as a way to brainstorm projects for small teams to undertake is a unique contribution from the BOP's foresight work.

The BOP believes that Federal agency foresight efforts are more likely to be sustained if there is a central foresight body in the Federal government that supports it. As a model, they suggested the Joint Terrorism Task Force created after 9/11 to which agencies reported and coordinated on anti-terrorism activities or a foresight center to assist in visioning and strategy integration similar to the non-partisan PNSR recommendations.

Bureau of Safety and Environmental Enforcement – U.S. Department of the Interior

Organization/Resources

The U.S. Department of the Interior's Bureau of Safety and Environmental Enforcement (BSEE) began foresight activities in 2015, which were sponsored by the Associate Director of Strategic Engagement, who has since left the Bureau. BSEE dedicates approximately 0.5 FTE overall to foresight efforts. The foresight initiative's core team consists of seven to eight people from the BSEE directorate in Washington, including staff from the Office of Policy and Analysis, Office of the Director, and the Office of Congressional and International Affairs. In the future, they would like to add people from their regional and program offices to the core team. They did some market research on consultants but decided not to use contractor support for the initial round of foresight and they do not have an extramural budget.

Foresight Methods

BSEE's initial foresight effort focused on using horizon scanning in the fields of energy and the environment. The foresight team used the STEEP framework (society, technology, economy, environment, politics) to scan broad news sources, used Google searches to find articles, and conducted interviews. They used an Excel database to track literature they found and met weekly to discuss their findings. Based on this scan, the foresight team wrote a draft internal emerging trends report that was shared with senior management. The report highlighted trends such as improving remote sensing technologies for better pollution detection, greater use of data analytics, and climate change. It considered implications of trends for BSEE but did not provide recommendations.

The next steps the foresight team would like to take is to develop scenarios based on the trends and drivers identified in their initial report, using an expanded set of participants with representation across BSEE and across regions.

Forward-Looking Time Frame

BSEE's initial horizon scan looked 10 years out. As a new agency, there were several immediate needs that needed to be focused on and the 10-year timeframe was adopted given uncertainty associated with potential fluctuations in oil and gas prices, the biggest determinant of the offshore industry.

Leadership Involvement

The Horizon Scan Report was presented to senior leadership to generate awareness rather than to give recommendations and to serve as a proof of concept: people can see how foresight might impact their work and are open to the concept.

Integration into Planning and Management Processes

BSEE would like to have their next round of horizon scanning feed into their strategic planning process. They believe locating foresight and strategic planning in the same office is important for producing awareness of foresight among planners. As a new agency, BSEE has had only two strategic plans so far. The first plan was driven by senior leadership; the second was led by senior leadership with support from staff of the Office of Policy and Analysis, and included input from across the Bureau. The next strategic plan likely will use a similar process as was used in the second cycle, which could allow an opportunity for the new foresight initiative to have an influence.

The foresight team is considering ways to integrate foresight with ERM and they currently are working on an ERM lessons learned study to develop recommendations on how ERM can be performed better, integrated with foresight, and made more helpful to leadership.

Conclusions and Broader Observations

The BSEE foresight team believes their initial trends report was a good first step that has helped establish strategic foresight as a credible, valuable process. They do not feel like they have a complete foresight process, however, just a beginning. They would like to expand into the use of scenarios as both a tool for strategic planning and a way to get staff across the organization talking to each other and thinking about long-term problems. They would like to get participation and buy-in from people across the organization. They recognize however, that there is a limited amount of “bandwidth” they can devote to foresight.

Central Intelligence Agency

Organization/Resources

The Center for the Study of Intelligence is the CIA's think tank on the profession of intelligence. The Center studies the profession of intelligence itself to identify its lessons, best practices, and the challenges that lie ahead. The Center includes four programs: Document History, Lessons Learned/Best Practices, the CIA Museum and the Emerging Trends Program.

The Emerging Trends Program was initiated in 2010. Its mission is to identify and explore trends in business, society and technology that are likely to affect the profession of intelligence. The program is specifically for the CIA, but its products go to the NIC, the DNI, and benefit the intelligence community as a whole. The program is relatively small. People in the program have very different backgrounds, from economics and political science to engineering. They generally are not technical specialists. The budget for the Center as a whole has remained stable. It divides resources among the Programs as appropriate from year to year to carry out planned activities.

Foresight Methods

Horizon scanning is the foresight method the program uses. They rely on an industrial contractor to bring trends and emerging developments to their attention. This is necessary because the CIA is the "ultimate gated community," isolated by intention, so they need to rely on others who work with the business community, universities and other areas of society to help them understand emerging developments outside the Agency.

Once a trend is chosen, they do a thorough examination that involves literature reviews and interviews. In addition, staff typically take a study trip to wherever the trends or new developments are happening (businesses, research institutes, and so on) to do documentary research. The program looks at organizational trends affecting operations as well as external trends. They try to focus on topics that people within the CIA are not focusing on that will affect their profession. Examples of recent projects include:

- World of abundant data: This study on the extraordinary availability of data and the changing information environment had a great deal of impact.
- Internet of things: The program conducted a study on connected homes and connected cars and what the implications of these technologies are for security and intelligence operations.
- HR: The program has conducted studies on what new entrants into the workforce are looking for in an employer.
- Smart change: The study looked at organizational agility in the private sector.
- Wireless communication: Benefits and security implications for wireless communications.

- Identity in the digital age: Challenges for protecting identity.
- The growth of the hyper-empowered individual/group given the ease of access to technology.
- Impacts of social media on the intelligence profession.

The products of these research efforts are written reports that summarize the results of the trend analysis and include challenges and opportunities for the CIA. When requested, they also make presentations on their reports but they do not offer workshops or other information sharing approaches.

Forward-Looking Time Frame

The Program looks for trends that could affect the profession of intelligence in the next 3 to 5 years, but that, in many cases, are important enough to have impacts over decades ahead.

Leadership Involvement

Leadership is not directly involved in research, but the staff has generally been with the CIA for a long time and has extensive contacts with leadership throughout the Agency. This allows them to test receptivity to pursuing various topics and to ensure their reports are influential.

Integration into Planning and Management Processes

There is no formal mechanism to integrate results of the studies into the various strategic planning processes in the CIA. Their primary aim is to get their reports into the hands of people who make CIA policy. Their work has been a “socialization process” helping to get people in the CIA thinking more about what is happening in the world around them and how that will affect their work in the future.

Conclusions and Broader Observations

Their experience in making their reports influential is relevant to other agencies:

- Focus on topics that are potentially important for the organization’s future, but are not already being focused on.
- Tie reports to some challenge or opportunity of concern within the organization.
- When possible, partner in conducting studies with another operating unit in the organization.
- Prepare reports in a visually appealing way with good graphics on the cover, graphics inside and high quality paper.

Foresight in the Federal Government: Supplemental Information

- Make reports relatively short and hard hitting.
- Have some of the people involved in the foresight program be senior, long time employees with extensive contacts throughout the organization.

Coast Guard – Department of Homeland Security

Organization/Resources

Attempts at forecasting began in the mid-1990s. These efforts became more formalized in “Long View,” which began in the late 1990s and initiated the use of scenarios. Evergreen as an ongoing effort began in the early 2000s. The purpose of Evergreen is to provide Strategic Orientation for the Coast Guard. The program is not designed to be prescriptive on which assets to acquire. The intent is to inform the dialogue and provide context to facilitate strategic decision making by Coast Guard Senior Leadership.

Evergreen is located within the Office of Emerging Policy, which falls under the Deputy Commandant for Operations (3-star Admiral) who reports directly to the Vice Commandant of the Coast Guard. Evergreen and the Office of Emerging Policy are being integrated into a new Innovation Council. Members of the Innovation Council will make recommendations to three-star admirals, based in part on Evergreen reports. This provides a mechanism for information to reach senior leadership.

Staff support includes two people working full time (2 FTE) to manage the program. In addition, a core team that includes 20-25 people from multiple offices works on strategic foresight on a volunteer, as-needed basis. Overall, approximately 200 people participate in Project Evergreen foresight activities, but they are trying to increase that through the use of technology (surveys, Delphi method, etc.) during this next cycle. People are willing to help because being involved in Evergreen is seen as prestigious. Officers want to participate to have some influence on it.

Evergreen is given a budget based on estimates of what projected activities will cost – roughly \$500,000 - \$750,000 a year. A four-year project cycle costs \$2-3 million. A scenario-based study on the Arctic will cost \$0.5 million.

Foresight Methods, Products and Uses, Clients

The Coast Guard’s Evergreen strategic foresight process has developed a 4-year cycle. Year 1 – research with a focus on scanning, Year 2 – development of scenarios, Year 3 – strategic foresight workshops using scenarios, Year 4 – operationalizing, smaller focused workshops, and the strategic foresight report.

While scanning is the major focus of Year 1 in the cycle, it continues on a lesser scale throughout the process. Contractor support plays a major role in the scanning process, but the Coast Guard takes the lead in subject matter areas where it has expertise.

In year 2, there is a lot of interaction in drafting scenarios, with Coast Guard people suggesting ideas and the contractor integrating ideas into draft scenarios. Coast Guard scenario teams review and collaborate with the contractors on the development of each scenario. Workshops are held on each scenario with participants from all levels of the Coast Guard. In the last round of scenario development, 4 major dimensions of change were explored and the interactions of these dimensions led to 16 different scenarios. Senior leadership picked 5 scenarios for further development.

In year 3, workshops were held on each of the five scenarios, exploring their implications for the Coast Guard. In year 4, workshops developed recommendations and the process and recommendations were set out in a strategic foresight report to the Commandant.

The typical Evergreen cycle may change in the near future. It has always been very "workshop-focused," but market research they are conducting has made them aware that there are a variety of other methods that can be used to gather insights from large groups of people while still maintaining a scenario-based planning approach. They plan on letting their contractors be innovative and creative in attacking this challenge.

There are no formal training programs; involving people in the foresight process is a learning-by-doing form of training. Foresight presentations are made at the senior enlisted leadership course (required prior to becoming a senior chief) a few times a year. People in this group may one day become Commandant.

Forward-Looking Time Frame

Generally, the Coast Guard has found 20 years is a good timeframe for strategic foresight and organizational planning, but the appropriate time frame can differ for different topics. They are working with a 30+ year timeframe on a project beginning on the Arctic, but on cyber it's hard to think beyond 10 years. The timeframe used depends on how far into the future a plausible scenario can be developed.

Leadership Involvement

The strategic foresight 4-year cycle is timed to reach completion shortly before a new Commandant takes office. The strategic foresight report is prepared for the new Commandant and is included in his/her strategic planning guidance. New Commandants push out a strategic plan within a few months of taking office. The process begins anew when a new Commandant takes office. Because the Coast Guard grows its own leadership, potential candidates to be the next Commandant almost always have been involved to some extent in previous Evergreen activities.

Integration into Planning and Management Processes

The Coast Guard does not have to provide a strategic plan under the Government Performance and Results Act (GPRA); the Coast Guard is included under the Department of Homeland Security's strategic plan and there is no one Coast Guard strategic plan – offices have different plans. The “Commandant’s Intent” document is the *de facto* strategic plan. The goal of Evergreen is to influence the Commandant.

The Coast Guard reports externally on performance to enable DHS statutory compliance with GPRA and other laws and regulations. GPRA and OMB circular A-123 require that agencies describe in their annual performance plan the means used to verify and validate performance information.

Conclusions and Broader Observations

Evergreen is one of the longest running and most developed strategic foresight activities in the Federal government. Some observations based on their experience are listed below.

- Identifying core team members with the needed knowledge, bent of mind and interest is a major staff priority.
- Scenario-based planning works well and allows people from a variety of backgrounds to get involved in the process.
- Including Vignettes – stories of daily life in alternative futures - makes scenarios more vivid and engaging.
- Have scenarios and other work products reviewed by many people inside and outside the organization, including academics and people in the private sector.
- Have a “Contributors Page” that lists all people who helped write and review the scenarios, which makes them more credible.
- Contractor support has been important, but it would be good to be more organic, to develop a better in-house capacity to use foresight processes.
- Adaptability is important. It is sometimes necessary to shift the focus of work to what leadership is interested in and to focus on shorter time frames (5-10 years) while still developing a longer-term plan.
- Recruit for workshops people from different parts of the organization, at different levels, and with a wide variety of work and life experiences.

Department of Veterans Affairs

Organization/Resources

The Department of Veterans Affairs (VA) Strategic Foresight group is located in the Office of Enterprise Integration, which encompasses strategic foresight, strategic planning, performance management, enterprise risk management, and data governance. It currently operates with a core

staff of 4 FTE, but it is supposed to have ten. In addition, they use a four-person contracting team with a budget of about \$300,000. The large groups that participate in horizon scans and scenario discussions contribute as part of their jobs.

Foresight Methods

The Office conducts a continuous horizon scanning process to identify trends and drivers that impact the planning environment, and it uses an intensive round of scanning as the first step in a quadrennial strategic foresight process. This initial scan is conducted using 80 to 100 people across VA offices. Working in small teams, participants select about 100 trends and drivers to explore and discuss, and about 80 short trend papers are written by the teams. The core team, with contractor support and input from subject matter experts and external stakeholders, work to narrow this list. They pull together a synthesis of approximately 20 driving trends judged most worth focusing on and conduct more in-depth scanning on those trends. An effort is beginning to wrap strategic foresight and predictive analytics together to make their work better grounded in data.

After completing the scanning, the core team and contractor use the driving trends to construct a set of alternative worlds or scenarios. In the latest round of work there were four scenarios entitled Dystopia, Spartan Stability, Mazlovian Age, and Global Federation. Once those worlds were constructed, the larger team of 100 people participated in workshops to pull implications from these worlds. They thought about what is happening in each of the scenarios, lived in them mentally, and drew implications for the VA.

The Office has found that developing scenarios with the proper focus is important and difficult. The VA's first round of scenario planning was too internally focused — VA centric. It missed several external factors and trends that would affect the VA's operating environment. The second round scenarios were too externally focused and did not lend themselves to analysis of what the VA and veteran's futures would look like. They are now trying to find the happy middle ground.

With the implications for the VA and veterans explored for each scenario, the next step is to discuss and agree upon imperatives. Imperatives are a set of characteristics that describe how the VA should be structured and the services it has to provide to succeed in each of the scenarios and to be as successful as possible across all the scenarios. The larger strategic planning team has to reach agreement on the future of operations at the VA. Then the Office produces a document with a clear set of "therefore, VA will need to..." statements.

At this point, the Strategic Planning Office takes the lead. It conducts a *gap analysis* to compare the current state of the VA with where it needs to be based on the imperatives. The analysis aims to formulate goals based on assessing which gaps are most important for the VA and what options are available to fill the gaps. The Strategic Planning Office also produces an annual strategic

environmental assessment that focuses on what is going to change about the veteran population and its specific need groups over the next 10-15 years, what will drive the demand for VA services and benefits, and what the future looks like in terms of best practices for delivering care and services.

Forward-Looking Time Frame

The VA strategic foresight process was initiated in 2011 when the VA Secretary saw that the organization was looking ahead with a one- to two-year time frame for developing budget and wanted to look 10-20 years ahead for planning purposes. The current planning scenarios extend to 2024. The Office sees itself as bringing insights from this time frame to inform decision making over the next two to five years, the time frame leadership generally works with in our current political reality.

Leadership Involvement

A workshop that involved senior staff in drawing implications from the scenarios was designed to help them understand from where the implications and imperatives were derived. The goals and objectives developed in the process are available to the next Secretary to accept or modify. The modified goals and objectives are submitted to OMB.

Integration into Planning and Management Processes

GPRA requires the VA to develop a strategic plan and the VA decided to make strategic foresight the foundation for strategic planning. As they publish new changes in trends and drivers, this information is put into annual planning guidance for all VA offices.

The VA also conducts strategic reviews under GPRA. They have been pushing to have performance management and risk management incorporated into their work. Strategic foresight is a primary mechanism for developing their set of enterprise risks. A quarter to a third of the risks in their profile will come from foresight work. VA is building performance measures for each of their objectives, starting with goals for FY 2023 and back-building their performance measures from there. They are trying to build cascade goals for the next five years to determine what performance path is needed, then develop an annual campaign plan to achieve those outcomes.

Conclusions and Broader Observations

The VA has one of the most mature strategic foresight efforts in the government. When it began, they looked around the Federal government and found a few pockets where foresight was being practiced but there was little interaction among them. This led the VA to initiate the Federal Foresight Community of Interest. They consider their best achievement to be making foresight the foundation of their strategic plan.

Environmental Protection Agency

Organization/Resources

Almost from EPA's inception, there were scattered efforts within the Agency to explore the use of scanning, scenarios, and visioning exercises for environmental foresight. The largest single foresight initiative was the establishment in the early 1990s of a formal Futures Studies Unit in the Office of Policy, Planning and Evaluation (OPPE). Innovative EPA programs such as Energy Star were born from the groundbreaking work of this futures unit. This foresight initiative ended when OPPE itself was eliminated in an agency reorganization. A new round of foresight work began in the late 1990s within the Office of the Chief Financial Officer (OCFO). A "Futures Network" was organized, small horizon scans were performed, training sessions on scenario development were held, and scenarios were used in an exercise with senior management. For a time in the mid-2000s, the Agency's Office of Research and Development (ORD) conducted a regular environmental scan and produced a handbook of foresight methods. These activities helped the EPA get ahead of several emerging issues, such as nanotechnology, genomics, citizen science, distributed sensing, advanced materials, and 3-D printing, but retirements and other factors again led to a fall-off in activity.

In recent years, advisory bodies, such as the EPA's Science Advisory Board (SAB), the National Academy of Sciences/National Research Council (NAS/NRC), the National Advisory Council on Environmental Technology and Policy (NACEPT), and the Office of Management and Budget (OMB) have consistently highlighted the importance of strategic foresight for helping the EPA better prepare for future threats and opportunities and have called on EPA to go further to institutionalize strategic foresight.

In response, staff and management from the Office of the Chief Financial Officer and the Office of the Science Advisor collaborated to implement a one-year Strategic Foresight Pilot project. The Pilot established an Agency-wide 19-member Lookout Panel that included representatives from each of the EPA headquarters offices and three regional offices, with a cross-cut of disciplines and expertise. EPA's innovative Skills Marketplace Program was used to recruit Lookout Panel members to devote up to 10 percent of their time to the Pilot Project. The Pilot also created a Community of Practice (CoP) open to all Agency staff. The CoP sponsored a series of webinars featuring speakers from other agencies who discussed how they conduct strategic foresight and with subject experts who spoke on specific emerging issues.

Staffing for current foresight work is at the level of 0.5 FTE, shared by OCFO and OSA. A budget of approximately \$50,000 was made available for contractor support.

Foresight Methods

Three face-to-face plus webinar training sessions were held to familiarize Lookout Panel members and others with strategic foresight concepts and methods. Then, the Lookout Panel members undertook a major horizon scan drawing on their own knowledge, extensive literature reviews and discussions with environmental thought leaders within and outside of the EPA to identify emerging risks and opportunities. Over 80 emerging issues were identified, and eight were chosen as priority issues especially relevant to EPA. Lookout Panel members formed small teams to explore these issues in depth and recommend potential actions EPA could take. The Lookout Panel identified several effective aspects of the project including the ability to bring multiple organizations together to systematically identify cross-agency issues and engage experts inside and outside EPA.

The priority issues were included in an internal draft report on the results of the Pilot project that was disseminated by the Acting Deputy Administrator to EPA's senior leadership in December 2016. The joint OCFO-OSA foresight team also discussed the report's findings and recommendations with agency program planning staff.

Forward-Looking Time Frame

In conducting the horizon scan, Lookout Panel members were encouraged to look out 20 years or more. Once priority topics were identified, it was often necessary to adopt a shorter time frame (2 to 5 years) to consider near-term impacts and potential agency actions.

Leadership Involvement

The Foresight Pilot project was jointly championed by the EPA's Science Advisor and the Deputy Chief Financial Officer. Lookout Panel members engaged leaders early on, testing their interest in different topics and soliciting their ideas. Senior career leadership also were briefed at key milestones in the project and preliminary results were provided to career leadership as background information for a meeting on enterprise risks. The EPA Administrator and Acting Deputy Administrator were briefed and the Acting Deputy Administrator disseminated the final internal report to agency leadership.

Integration with Planning and Management Processes

In the past, foresight efforts have been reflected in minor ways in the Agency's strategic planning documents (e.g. external factors), but foresight has never been well integrated into GPRA planning or enterprise risk management. As a follow-up to the pilot project, OCFO's strategic planning guidance requested programs to consider the results of the pilot in developing the 2018-2022 strategic plan. Foresight staff are currently investigating ways of utilizing the results of the Pilot project and to develop options to institutionalize strategic foresight.

Conclusions and Broader Observations

Foresight in the Federal Government: Supplemental Information

EPA has been involved in strategic foresight for as long or longer than any other Federal agency. EPA's foresight activity, however, has waxed and waned and institutionalizing foresight in agency-wide planning and risk management processes remain a challenge.

Federal Bureau of Investigation - Futures Working Group

Organization/Resources

The Futures Working Group was started in 1998 in the Social Science Unit at Quantico, VA. A nine-person core group did the planning and organizing. The effort eventually involved about 60 participants from the FBI, state-level law enforcement where the FBI has a support function, academia, and the private sector. It has been dormant over the past two years but was recently moved to the FBI's Training Division, where there is a supportive climate. At present there is no budget. It was never more than \$100k per year and there was never as much as 1 dedicated FTE.

Foresight Methods

Initially most activity involved organizing guest speaker presentations by experts on various topics. It eventually evolved to a level where several occasional working papers were produced addressing issues like Katrina-type logistics and school violence. A few meetings made use of Delphi and scenario exercises. Delphi is a subjective fallback for when a field of study is not well understood. It is sometimes helpful, but there are other methods that usually are more helpful, including scenarios.

Forward-Looking Time Frame

We typically looked ahead a decade or so, but this varied with the topic and the interest of participants. Caveat: The hardest part of futures work is the timeline- when will it happen? Temporal estimates and assumptions can be severely mistaken.

Leadership Involvement

While early on there was substantial mid-level support, with personnel changes it disappeared. In part that was because of rapid rotation of senior and middle management. There was no structural incentive to maintaining and improving what would not provide short-term gain.

Integration into Planning and Management Processes

There was never an effort to tie this informal activity to the FBI's strategic planning.

Conclusions and Broader Observations

The Futures Working Group is one of the longest running foresight activities in the Federal government, but the people involved have not aspired to develop it into a more formal initiative

tied to the Bureau's planning and decision making. Some lessons they draw from their experience include:

- A small group (five-nine people) is best for getting work done.
- Involve new staff as well as more senior people: while there are sharp limits on how much change can be made in the near future, changing the thinking and culture of new staff can influence the organization over time.
- It would be good to build Foresight Training into the curriculum of the Federal Executive Institute. This could be possible if it was promoted by multiple agencies and the Federal Foresight Community of Interest.
- In using scenarios for planning, the important part isn't the resulting plan so much as the changes in the whole way of thinking of the people doing the planning. "Plans are worthless, but planning is everything." (President Dwight Eisenhower, Remarks at the National Defense Executive Reserve Conference 11/14/57.)
- "It is a mistake to think of foresight as separate from the rest of the work we do. We engage in foresight every day. All of us. Consider our usual bureaucratic task groups, e.g., budgeting, human resources, evaluation, assessment, training, procurement all of that "routine" stuff is about working toward futures. Why do we somehow consider it otherwise? Or consider leadership: leadership is inherently about change which is about moving from where we are to a preferred future. Many of the decisions we make today have impacts that reach many years into the future. By drawing a bright line between normal work and futures work we make futures work unnecessarily arcane, dismissible and easy to defund."
- One challenge for futures groups operating within government: probable futures may well cross or obviate the need for agency boundaries or agencies themselves.
- "Futures work seems somewhat mystical to many folks, even bright folks. It is not helpful to transfer a person into a futures role and expect that to work well except perhaps in very concrete tasks. Sadly, for most people, even very bright people, history died yesterday. They know that change happened in the past but they are unable to project it into the future except as a linear and concrete extrapolation.... So, how best to do futures work within government? Clearly, contracting the task out moves the problem rather than solves it. Inability to inculcate futures is almost never a matter of money. Instead, agencies might recognize that many people would be willing to help government with its futures (and other) tasks, often for only reimbursement of expenses and an occasional pat on the back -- if those volunteers were asked. This interest in volunteering is true of many academics as well as of some folks in the private sector and even other government agencies. It's about networking rather than employment."

Federal Emergency Management Agency

Organization/Resources

Strategic foresight work at the Federal Emergency Management Agency (FEMA) was initiated in 2010. The foresight program is located in FEMA's Strategic Planning and Analysis Division. The program has 2.5 FTE and another 2 FTE in contractor support with an extramural budget varying between approximately \$250,000 and \$750,000. They also have been able to leverage support from other offices within FEMA.

Foresight Methods

Scenarios are the primary foresight method used at FEMA. People there are comfortable using scenarios because of their experience participating in disaster response exercises. In their initial round of foresight activity, they adapted five scenarios developed by the Coast Guard.

In working with the scenarios, FEMA reached out to their whole community – partners at the state and local level, non-profits, community groups, the private sector, and think tanks – to create a group of approximately 70 people. All these people were immersed in the scenarios and then challenged to identify the “strategic needs” that could drive emergency management in these alternative futures. The group identified over 80 strategic needs that were aggregated into a set of 15 critical needs based on common denominators and importance. These needs were set out in the agency's first foresight report in January 2012. An environmental scan also was included in this report, although it was not the central focus. In 2013, FEMA issued a follow-up report that looked at best practices for using foresight at the local level.

In their more recent foresight effort in preparation for the next strategic plan, members of the foresight program conducted a new horizon scan (including a review of over 100 documents), removed some trends from consideration and added others, and developed their own scenarios. Importantly, they focused on core capabilities. The emergency management community has identified 32 of these critical capabilities across the five mission areas that drive emergency management. Thinking in terms of core capabilities helped participants see how different future circumstances could impact their work. These impacts were translated into strategic needs, which were prioritized in a workshop based on factors such as the most significant impacts on emergency management and the greatest degree of change necessary from current practices.

FEMA also briefly looked into the use of strategic indicators. The idea was to identify threshold points where emergency management practices would need to change in response to various threats or increasing risks that were reaching a certain level of criticality. This met with limited success due, in part, to the lack of convincing data.

Forward-looking Time Frame

In its initial effort, the FEMA team looked out 20 years. In the current effort they are looking out 15 years.

Leadership Involvement

One approach used to involve leadership was to have senior career executives become “Priority Champions.” They involved nine executives, each of whom “owned” or “co-owned” a strategic objective and was responsible for developing an integrated approach for addressing that objective. In some cases, the strategic objectives were built into their individual performance standards.

FEMA has used a “placemat” for a senior leadership meeting, a presentation format using an 11” x 17” sheet with four quadrants for displaying key findings in areas such as key trends/emerging developments, key implications and strategic objectives.

Including a large number of people from across the agency in scanning and scenario workshops has helped build support for foresight among senior leaders and at some lower levels of the organization. They have used webinars to reach out beyond FEMA headquarters and at one point had an 1100-person community of practice composed mainly of people at the state and local level. It is not active now but they believe it would be good to revive such an approach.

Integration into Planning and Management Processes

The strategic foresight process is positioned in FEMA’s Strategic Planning and Analysis Division and the head of that division is deeply involved in the foresight work. Their goal is to fully integrate foresight into the Agency planning process. The “strategic needs” developed in the first round of work were incorporated into FEMA’s 2014 Strategic Plan.

Conclusions and Broader Observations

FEMA has developed one of the better foresight processes and has reached out to emergency management officials around the country for their involvement. They believe, however, that to be even more effective they need to improve their outreach to planners, developers and others in the development community who have a great deal of influence, especially in the area of reducing future disaster risk.

Organization/Resources

The U.S. Forest Service (USFS) Strategic Foresight Group (SFG) is organizationally within the Forest Service's Research and Development Branch and located at the Northern Research Station. (One of 16 research units within the Northern Research Station.) The SFG started its work two years ago. As researchers, they focus on producing peer-reviewed publications. Ways to structure their group to have more outreach to policy/decision-makers are currently being considered.

The SFG's operating budget – for funding external foresight work – varies from year to year but has been in the range of \$20,000 to \$30,000 per year. In addition, SFG receives approximately \$10,000 per year from other groups within the USFS. The SFG consists of a project leader, an ecologist, two social scientists and other support staff. About 3.5 FTEs are devoted to futures research. In addition to these staff, from 3 to 5 people participating directly in their research projects from outside the SFG, and about 100 to 200 people (mostly USFS) participate in foresight workshops, futures wheel exercises, and other foresight activities. The SFG has formed working partnerships with the Institute for Alternative Futures, the University of Hawaii, the foresight program at the University of Houston and other futurists to help with their projects and to learn a broad range of methods that could be applied to their work.

Foresight Methods

The FSG emphasizes work on the foresight methods themselves. They are learning and documenting various methods so that people in other Forest Service offices and other natural resource organizations can use them. They want to produce materials that make the methods assessable to people who could use them in a more operational context and are currently working to develop a General Technical Report for broad distribution.

Horizon scanning is the technique that undergirds most other methods. FSG developed and is running a horizon scanning system in conjunction with the foresight program at the University of Houston that is intended to be permanent. In this first stage, a group of volunteers (about six people) serve as scanners and are actively putting information into an online database. Horizon scanning is seen as a tool to feed into virtually all their work.

Scenario Planning is the other major method used. The largest scenario effort to date was working with the Institute for Alternative Futures on a "Fire Futures" project, which included conclusions about the need for a "paradigm change" in wildfire management. Other research is coming to similar conclusions and the cumulative impact may change policy over the years ahead. Scenarios also have been used in a project with the University of Hawaii on wood-based nanotechnology and in climate adaptation planning with tribal communities in the Great Lakes states.

Forward-Looking Time Frame

The SFG's work sometimes involves longer time frames than considered by most other government agencies. Forestry has always dealt with very long time horizons: 50-100 years for timber projections, 150 years for growth and yield models. Climate change has become a major variable in forest planning and International Panel on Climate Change (IPCC) scenarios extend to the end of the century. Backcasting work the FSG has done with the University of Houston looks out 100 years. They believe these time frames are justified in some areas of forest planning, but they appreciate how difficult it is to integrate thinking on that time scale with efforts to develop actionable recommendations or create scenarios that include developments in fast-moving areas of technology, economy and society.

Leadership Involvement

The SFG has involved leadership of the Northern Research Station in some foresight activities. For example, it ran a series of futures (implications) wheels for the leadership related to decisions associated with research and forest management planning. However, on a larger scale, the unit sees a need to work more closely with Forest Service leaders and policymakers.

Integration into Planning and Management

The SFG has not contributed yet to larger national planning efforts, but it hopes to be part of future iterations of the Forest Service's Resources Planning Act assessment, the agency's strategic planning efforts, and national forest planning.

Conclusions and Broader Observations

As a research group, the Strategic Foresight Group is relatively detached from organizational planning and decision making in the Forest Service, but it is conducting a wide range of work on foresight methods and consulting on several Forest Service projects. The General Technical Report on foresight methods and other materials the Unit is developing may be broadly useful in the Federal foresight community. Its approach of forming mentoring relationships with universities and think tanks involved with futures research has worked well and may be a model for others.

Government Accountability Office

Organization/Resources

Core to GAO's mission is to ensure government accountability and effectiveness, and key to this role is foresight and the ability to understand evolving trends and evaluate emerging issues. To fulfill its mission, GAO performs oversight and insight work, but it also does foresight work to identify emerging issues that present both opportunities and significant risks to government operations and finances. The guide to government auditing standards.¹ that GAO issues highlights the role of foresight; it notes the role of prospective analysis to provide conclusions based on current and projected trends and forecasting program outcomes under various assumptions.

GAO's foresight office conceptualizes its foresight capability along two lines: a management side and an operational side. On the management side, strategic foresight has been integrated into the planning process. Core responsibility for foresight has been placed into the organization's office of Strategic Planning and External Liaison, which is headed by a Managing Director who reports directly to the agency head; in the office, a Strategic Planning and Innovation Manager is responsible for planning and foresight. Thus, foresight has a prominent place in the agency and is a short step from top leadership. On its mission and operational side, the agency issues several reports each year that integrate foresight and related approaches; these include technology assessments, expert forums that address a variety of emerging issues of national importance, and prospective studies of government finances, programs and operations. The foresight team believes there are advantages to having strategic planning and foresight integrated in a single office.

Importantly, GAO's foresight office has created the concept of a "Foresight Ecosystem" that reaches across the entire organization. There are threads of foresight-related activity throughout the agency, which include technology assessments, internal forums, training activities, the use of external advisory boards, and other activities. The ecosystem concept is in part a recognition that foresight work is already going on in different parts of GAO, but that these efforts are not necessarily labeled as such. It is part of an ongoing evolution and change management process to bring foresight to a broader audience within the agency. The ecosystem concept highlights these activities and helps unify efforts for the agency as a whole. The ecosystem concept creates linkages and promotes a culture of foresight so that the whole system can benefit.

The staffing model for foresight relies on a small, dedicated team at the core, which can leverage expertise and resources from across GAO on specific projects and programs. For example, the core foresight team often partners with subject-matter expert teams to bring outside speakers to GAO as part of its Foresight Speaker series. The foresight group also partners with other teams on major

¹ GAO "Yellow Book", Government Audit Standards (GAO-12-331G), 2011, Washington D.C.

issues such as artificial intelligence or the opioid crisis that result in a published GAO report on the topic. In this model, foresight is integrated into the work of staff across the agency.

Foresight Methods

Environmental scanning has been a primary focus of the strategic planning office's methodologies. Sources for their scans include literature reviews; publications of nongovernmental organizations, such as the Organization for Economic Cooperation and Development and the World Economic Forum; external networks in the futures community; Federal colleagues; and meetings with futures experts and visionary thinkers. On the operational side, in some cases GAO has developed specific foresight methods, where appropriate, for its work. One approach used is to convene expert forums with subject-matter experts and visionary thinkers; others have included foresight methodologies like scenarios and Delphi.

Forward-Looking Time Frame

Scanning efforts generally look 5 to 20 years ahead, although time periods of more than 50 years are used in GAO's simulations of the long-term fiscal condition of the United States.

Leadership Involvement

The position of the foresight function near the top of the organization, fully integrated with strategic planning, helps assure high-level awareness and involvement. The foresight team also organizes training events for GAO's Senior Executive Service (SES) development class. This introduces future executives to foresight concepts and shows them how foresight can be used as a management tool and to help ensure GAO's work remains responsive to the future needs of Congress.

Integration into Planning and Management Processes

There is a formalized process to integrate foresight into the strategic plan. In addition to conducting environmental scanning, the agency conducts internal interviews to create a landscape of risks, opportunities, and outside forces that may affect GAO in the future. This analysis looks at macro trends that may affect GAO's operations and helps identify the range of possible issues Congress may ask the agency to analyze in the future. It also provides context for the development of goals and objectives for GAO's quadrennial strategic plan. The strategic planning and foresight team are currently analyzing different options that would enable continuous environmental scanning more widely throughout the agency. The planning and foresight team is also a stakeholder in GAO's risk management initiatives.

Conclusions and Broader Observations

Foresight in the Federal Government: Supplemental Information

Foresight at GAO is focused on supporting GAO's core mission and is integrated into key management processes. The group has demonstrated that looking ahead and being proactive can enhance decision making.

Foresight work at GAO leads to insights that can help the agency accomplish its work more efficiently and help identify critical emerging developments at the national level before they become even more difficult and even more expensive to solve.

The foresight team believes integrating strategic foresight into key agency processes and mission work is essential for its long-term effectiveness. This approach helps foresight develop more organically and enables a wide range of employees in different functions to see its value. The team attributes the Foresight Ecosystem concept to their program's success.

IBM Center for the Business of Government

The interests at the IBM Center include documenting the current state of Cross-Agency 4-year priority goals, improving Strategic Reviews, and improving alignment of annual budgeting, GPRA planning and enterprise risk management. The Center believes that one of the biggest challenges is to get different processes working together instead of separately. Strategic foresight, annual budgeting, GPRA planning and enterprise risk management should all be aligned, but with a few exceptions (mainly the VA) this is not the case. Foresight efforts and quadrennial review reports are poorly timed: quadrennial reviews are due after strategic plans but should be completed before them. Cross-government priority goals are often not a priority in agency goals. No one has sorted out how to get everyone together on time frames that make sense.

The IBM Center contributed to the National Academy of Public Administration (NAPA) Presidential Transition Project and recommends that at both the state and Federal level foresight would be more effective if supported by a high level office with functions like sharing information between agencies, providing training in foresight methods and coordinating cross-agency foresight initiatives. There are different options for how to base such an office:

- A University can be the base. For example, the University of Washington has established an institute that informs the legislature about the potential future impact of different legislative policies being considered. In another example, the Council on Virginia's Future has been operating for eight years. The state's Chamber of Commerce advocated for the creation of this council, citing that longer-term issues could not be effectively addressed in the governor's constitutionally-limited single four-year term.
- The Office can be hosted at the top: a Governor's office or within the White House.
- It can be a unit "off to the side of the top." An example is Policy Horizons Canada, which reports directly to the Privy Council. The Policy Horizons Initiative recently moved into a new Innovation Hub. People participate on a rotational basis (like the Coast Guard model), building capacity across the government. Another example is the Center for Strategic Futures in the government of Singapore.

Of these examples, he believes the ideal strategy for the U.S. would be modeled on Policy Horizons Canada — a unit that is off to the side but is connected directly to the White House. The Federal Foresight Community of Interest is a good sharing device, but it is not a good vehicle for other roles, such as initiating projects.

In some cases, a similar “off to the side of the top” arrangement can work within individual agencies, with a separate unit reporting directly to the secretary or administrator, with permanent staff but also interested people from across the organization rotating in over time.

Five foresight methodologies have been observed in government agencies. Horizon scanning is the most common followed by scenario planning. Also there have been occasional uses of Backcasting, Delphi forecasting and Futures Wheels.

In his experience, working on foresight should be a voluntary staff assignment. If there are mandatory rotations into foresight office, people may be reluctant participants. The agencies that have longer sustained initiatives are ones where participation was not mandatory and the people who were engaged in it were passionate about it.

Breaking down silos is important in practicing foresight and some foresight tools can help make this possible. The Office of Personnel Management pilot program “Gov Connect” allows people to rotate to other offices for a two to three-month time period. EPA has an internal Skills Marketplace/Talent Hunting program that allows EPA employees to spend part of their time on new projects. Encouraging communities of practice across the government can allow people in each agency to see how others are conducting foresight and create external places where experience can be shared.

Marine Corps - Futures Assessment Division

Organization/Resources

The Marine Corps Futures Assessment Division (FAD) was established in 2009. It was born out of a recommendation from the 2007 Requirements Oversight Council, which is comprised of high-level generals (mostly three and four stars). The FAD is comprised of approximately 9-14 people and includes uniformed members, civil servants, and contract support. This number and mix of personnel provides continuity for the Group despite the two- to three-year rotation of the uniformed members. The Group also includes a mix of staff from various communities (Ground, Aviation, Logistics, Intelligence) throughout the Marine Corps.

On the uniform side, the Futures Assessment Division has a budget of approximately \$130 thousand per year (not including salaries) to cover operations and maintenance. They also have an additional \$2.3 million per year for contract support (\$10 million over 5 years).

Foresight Methods

The Futures Assessment Division conducts scanning as preparation for scenario development. They produce a Marine Corps Security Environment Forecast (MCSEF) document every two years. The most recent document was published in 2015 with a *Science Fiction Futures* supplement in 2016. The report takes approximately nine months to prepare.

In preparing this report, they looked at a wide range of reports (e.g., reports by the National Intelligence Council and the United Kingdom Ministry of Defense) projecting future demographic, political and technological changes. Uniformed personnel conduct scanning to identify trends and emerging developments. The initial scan identified 24 potential trends relevant to the Marine Corps. Sixteen white papers, written with contract support, were ultimately binned into seven trend categories for use in the MCSEF (Demographics, Technology, Competition for Resources, Stress on the Environment, Globalization, Governance, and Urban Littorals).

The baseline scenario was developed by examining those trend categories through the lens of a PMESII construct (Political, Military, Economic, Social, Infrastructure and Information). Two alternative futures were included in the 2015 MCSEF and were based on accelerating two-to-three trends judged to be most “mutable” in the baseline scenario. Future A accelerated water scarcity and international migration. Future B accelerated biohacking and economic crisis. Final scenario descriptions were 10-12 pages in length and written by the Active Duty personnel. The scenario “worlds” are intended to be used in wargames in order to test future operating concepts and force structure.

Forward-Looking Time Frame

The FAD focuses on a time horizon of 15-30 years into the future and they consider themselves to be an “organizational reconnaissance team.” They argue that, for the military and other organizations that make large capital investments that have a long lifetime, it is important to conduct strategic foresight on this kind of time frame to evaluate and make informed decisions about potential investments.

The Group thinks in terms of simultaneous investments across three time frames and recommend that other organizations think in the same terms: 1) immediate challenges and needs, 2) mid-term needs and goals, and 3) long-term needs and goals. For them, Iraq and ISIS are examples of immediate issues, reintegration of the Marine Corps with the navy is a mid-term issue, and the challenges of a world with a billion additional people living in peri-urban slums is a long-term challenge.

Leadership Involvement

The FAD’s primary objective is to collect and organize information on what futures may be like and to bring that information back to the leaders and decision makers within the Marine Corps. They do not focus on thinking about potential solutions to any identified threats.

The Group believes the success of strategic foresight depends on the support of people at the top of the organization. They fortunately have that support because the Marine Corps’ strategic foresight effort was designed and initiated by a group of three and four star generals who saw that the military is good at fixing problems from the last war, but poor at identifying challenges of the next war. High-ranking officers appreciate the need for strategic foresight. The closer you get to ground level staff – to people preoccupied with immediate operations – the less appreciation there is for the deep future, which is why promotion of strategic foresight has to come from the top.

Integration into Planning and Management Processes

There is no formal process for integrating the Futures Assessment Division’s work into planning. All the materials they produce are made available to leadership and also made publicly available online. The Group also produces a newsletter, *Notes from the Edge*. The initial intended audience was Marine Corps colonels, but they now have approximately 1400 subscribers both inside and outside of government.

Conclusions and Broader Observations

The Group recommends several things that have worked well in their own experience.

For the 2015 MCSEF, they partnered with experienced science fiction writers to produce narratives that depict the future baseline and alternative scenarios. These professional writers mentored volunteer uniformed Service members as they produced the narratives. This was identified as one of the most successful aspects of the 2015 strategic foresight process, largely because these stories were engaging and brought the worlds of the MCSEF to life. The narratives put people mentally in the future environments. The scenarios were published online, and they were widely read.

All members of the USMC Futures Assessment Division take the University of Houston Professional Certificate in Foresight course to ensure all staff have a common frame of reference and vocabulary. The Group also maintains a network with other organizations conducting strategic foresight in government, business, and academia.

Organization/Resources

The Langley Research Center is a field center of the National Aeronautics and Space Administration (NASA) headquarters which does its own foresight and has developed scenarios and used them in strategic planning. At Langley, there is currently 1 FTE (one person) formally tasked with strategic foresight, operating as Chief Strategist within the Office of the Director. His foresight work has been limited to the future of Langley so far. In addition, there is a small core group of about 8 Langley staff that volunteers part of their time. Modest funding for consulting has been made available but there is no fixed budget. At this point the foresight function is valued and supported, but it is not structurally built into the organization.

Foresight Methods

Scanning and scenarios are used in focused studies. In 2009, a study was done that looked at future challenges and opportunities and how the Langley lab could change to meet them. The white paper produced from this futures analysis was widely shared and led to agreement at the lab about the nature of needed new facilities. Some of Langley's existing buildings were 70 years old, had high energy costs and required expensive maintenance, so Langley proposed to NASA headquarters that they would tear down two square feet of obsolete buildings for every one square foot of modern lab facility they could build. This resulted in three new buildings that meet the mission needs highlighted in the futures study, saving NASA maintenance money.

As Langley is celebrating its 100th birthday, it is currently doing another study to update and go beyond the 2009 effort. They are working on a horizon scan with the futures studies program at the University of Houston to consider forecasts for workforce, facilities, the digital footprint and other topics at Langley. The current study is entitled "Langley 2050."

Forward-looking Time Frame

They believe it is important to look far enough out to get away from current reality. They have seen studies aiming to look 10 years ahead that end up only thinking five years ahead, so they are trying to look out far enough to avoid getting stuck in the present. If NASA plans to send astronauts to Mars in the 2030s and build a permanent base there over the following decades, planning for Langley's capabilities needs to be grounded in what will need to be accomplished over longer time frames, not just over the five-year period of the lab's strategic plan.

Leadership Involvement

Langley leadership continually looks at future opportunities and has had a series of future focused studies to make sure they are staying on the forefront of both technology and management. These

studies are normally integrated into their yearly strategic plan update to course correct as they move forward.

Integration into Planning and Decision Making

At the Langley Research Center there is a lot of integration between strategic foresight and decision-making. But there is only a limited connection to formal Agency strategic planning because that plan has such a short timeframe.

Conclusions and Broader Observations

In retrospect, they believe they waited too long to do another major study and that there should be a regular cadence of scans and studies at much shorter intervals.

They stress the need for involving the “right kind” of people. That means attracting people with the right knowledge, skills and interest. It also means avoiding people whose attitude can get in the way by always saying things like “that won’t work,” “we can’t do that” and “that’s too controversial.” They also believe it’s important for people working on foresight to receive training. For the current study, they had a few people from across the Center go through the futures course offered by the University of Houston.

Apart from any specific methods, a “changed mindset” and organizational “culture shift” are what really makes foresight work. With workforce and hiring, for example, as positions open the normal tendency is to backfill those positions, but with a changed mindset there will be an effort to bring in skills needed for the future, called future-filling.

In doing foresight, they caution not to jump to solutions and recommendations too early. There needs to be a sufficient period of divergence and exploration before moving toward convergence on solutions.

However far foresight efforts look into the future, to be useful, they have to bring it back to the present and show what needs to be done in the near-term to achieve the long-term.

A cross-agency approach to foresight could be valuable. In particular, they would like to see a cross-agency approach to the future of Federal labs.

National Geospatial-Intelligence Agency

Organization/Resources

The National Geospatial-Intelligence Agency (NGA) Office of Strategic Operations (OSO) was set up in January of 2016. Foresight has been underway to a limited extent for several years within the agency's constituent units, typically with a scanning horizon of four to five years, but there was no holistic approach. This new office was created to pull together a bigger picture across units, project further out in key areas, and develop strategies for NGA as a whole. The unit includes one full-time position (who leads OSO's foresight activities) and contractor support.

They currently are establishing an internal foresight team of about a dozen people. Some participation is based on "who's relevant" and some on "who's interested," but going forward they hope to find better ways to identify the best people to involve.

Foresight Methods

Eighteen months ago, OSO (with contractor support) conducted a large internal scan/information integration effort. They developed a vision and a multi-year cycle of work. They are just beginning this work cycle now.

While they primarily conduct scanning, they also have developed short scenarios for use by internal workgroups. They have also done some "Red Cell" assumption testing efforts with other parts of the organization. The Red Cells identify assumptions and make counter-assumptions, challenging participants' views and preparedness.

While 18 months ago they worked internally with contractor support, in this round they are seeking outside perspectives. They recently held a meeting where they brought in futurists, science fiction writers and a variety of creative thinkers. The focus of this work is to identify future capabilities the NGA should develop, given emerging enabling technologies and potential mission requirements. They then will attempt to transition the results of this effort into operations and resource allocation recommendations.

Forward-Looking Time Frame

They believe there's high value in looking out longer-term, from 5 to 15 years. This longer-term view allows reflection on changing social conditions that could result from changes in technology. For example, the advancement of self-driving cars/vehicles is happening quickly and is pretty predictable, but a longer time frame is needed to consider the impacts on traffic flows, development patterns and all the ways self-driving vehicles will be used.

Leadership Involvement

In their first round of foresight activity they devoted a whole day offsite with the NGA's Director and senior staff. It reportedly shocked some of the participants, but was well received, which is one reason they are on an upswing now.

Integration into Planning and Management Processes

Their office is responsible for providing planning guidance. They also conduct enterprise risk management at the strategic level – risks to the organization as a whole – while other parts of the organization do their own ERM studies. Senior leadership wants to be able to implement strategic reviews, so performance measurement also was set up as part of the office's responsibilities.

The NGA's Executive Committee has a Plans and Programs Director, with whom they work directly to implement their recommendations into plans and programs and the budget structure. They have the only organization-wide view.

Conclusions and Broader Observations

Some of their observations based on their experience so far include:

- You can't conduct a scan once and then live off it for several years – change is too fast. Some amount of scanning should be done yearly, even if bigger efforts are only done periodically. Given rapid change, planning is best when “agile” and open to constant updates.
- There's a high value on focusing on areas others are not considering and looking out over longer time frames.
- Technology acceleration is the key driver of change in their area, and many other areas. Machine learning/deep learning will have profound impacts.
- They believe that getting extramural input for scanning is critical. Internal people know a lot, but often don't see developments outside of their realm of expertise or see interactions among developments in different areas. That's why they are beginning to involve futurists and other creative thinking outsiders and consider this a “best practice.”
- Leadership involvement with the corresponding messaging and follow through in daily engagement is very powerful. It gets everyone thinking the same way. On the other hand, having leadership involved in messaging but without the follow through in daily management can quickly undermine any strategy and tarnish what is otherwise a good plan to follow.

National Guard Bureau - Strategic Foresight Group

Organization/Resources

The National Guard only recently started developing their strategic foresight efforts. The impetus was primarily that the National Guard Bureau Chief became a statutory member of the Joint Chiefs of Staff in 2012 and he believes improved foresight can help him be more effective in this position.

The Strategic Foresight Group has 15-20 core members who attend biweekly meetings. This group includes a mixture of uniformed and civilian staff to provide continuity under the two- to three-year rotation schedule for most uniformed staff. The core group currently has members from all three National Guard entities: National Guard Bureau, Army National Guard, and Air National Guard. They also have a Community of Practice that consists of about 150 members.

The Strategic Foresight effort currently is a “coalition of the willing”: no dedicated staff are assigned to this effort and all members participate on a voluntary basis. The National Guard Strategic Planning Program provides a small amount of funding and stewardship for the program. They anticipate that as the program becomes more formalized they will need approximately \$0.5 million annually to stand up a staff of three to five people and to develop formal products.

Foresight Methods

The Strategic Foresight Group has not yet conducted any major projects or produced any products or reports but they have participated in some war-gaming. It does sponsor a strategic speakers’ series and has had six speakers so far. The Group plans to hold their first major workshop soon, with participants from other Federal agencies, academia, and other non-governmental organizations. The purpose will be to identify strategic focus areas, including both internal topics like recruitment and retention, and a range of external topics relevant to the National Guard’s responsibilities to states and the national military. After identifying topics areas, the Group will select three to five to investigate in greater detail using scenario analysis and war gaming and to develop foresight reports.

Forward-Looking Time Frame

No final decision has been made on the look-ahead time frame. The intention is to model the program after the Coast Guard’s Evergreen Program, which often works with a time frame of 20 years.

Leadership Involvement

The Strategic Foresight Group is getting input from senior leadership on how to develop the program. They anticipate that their products will be distributed to senior leadership within the National Guard and to governors for the 54 states and territories.

Integration into Planning and Management Processes

Details of how to integrate the foresight effort with planning have not been worked out fully.

Conclusions and Broader Observations

The National Guard's foresight efforts are underway even before the program is formalized and funded. They currently are learning from other Federal foresight programs and identifying ways to collaborate with other organizations. For example, opportunities to collaborate with other agencies on how ship traffic is likely to evolve in the North Atlantic over the decades ahead are being considered.

National Intelligence Council

Organization/Resources

The National Intelligence Council (NIC) supports the Director of National Intelligence (DNI) as head of the Intelligence Community (IC) and is the IC's center for long-term strategic analysis. Among other tasks to support senior policymakers the NIC produces global trend reports on a quadrennial basis, timed to provide information to incoming Administrations. In addition, it serves as a bridge between the intelligence and policy communities, a source of substantive expertise on intelligence issues, and a facilitator of IC collaboration and outreach.

The NIC's Global Trends reports are of relevance to people working on foresight in all Federal agencies. Although the target audience is the senior leadership in the Executive Branch of the U.S. Government, they do not explicitly frame their Global Trends report as a national security document. Rather, they attempt to capture most if not all trajectories of areas that intersect with U.S. national interests, which include trends in demography, technology, environment and ecology, health, economics, and ideas and identity.

The NIC's Strategic Futures Group produced the 2017 report, *Global Trends: The Paradox of Progress*², over a two-year period. The Strategic Futures Group consisted of roughly 13 staff members over the development of the report, although the actual number of people involved at any one time varies as people rotate in and out from other government agencies and organizations. Dozens of National Intelligence and Deputy National Security Officers also contribute to the work. There is a core group, but it is not permanent either, it simply rotates more slowly. Because the NIC is expected to provide rapid answers to any White House questions, they make extensive use of consultants and draw on a large network of experts in government, the private sector, universities and non-governmental organizations.

Foresight Methods

In the background of this most recent analysis, not visible in the report itself, was a major effort to review assumptions. A contractor was hired specifically to identify and examine assumptions underlying all the NIC's previous trend reports. It is difficult to be aware of assumptions that are at the foundation of one's own worldview, so outside perspectives and formal methods for key assumptions checking are critical. This effort forced a recognition that post-World War II institutional arrangements and rules and the whole pattern of multilateral relations that had been assumed to be relatively stable are breaking down and changing – a difficult realization for experts deeply invested in knowledge now becoming obsolete. The central focus of the global trend reports

² National Intelligence Council. 2017. *Global Trends: Paradox of Progress* (NIC 2017-001). In *Global Trends*. Washington, DC: Office of the Director of National Intelligence,

is on trend identification through horizon scanning and other methods. For the latest report, ideas were solicited from over 2,500 people. 35 countries were visited to study key trends firsthand.

Regional trends were examined first and then aggregated to identify broader global dynamics. Extensive use was made of analytic simulations — employing teams of experts to represent key international actors — to explore potential future trajectories for regions of the world, the international order, the security environment, and the global economy. A conscious effort was made to explore the potential for discontinuities in all regions and topic areas, especially discontinuities likely to represent fundamental shifts from the status quo.

Recent NIC reports also have included scenarios designed to illustrate how trends can interact and how key uncertainties and choices might result in very different futures. *The Paradox of Progress* report contains three scenarios, each of which portrays near-term futures with different types of heightened risks, but also with scope for more positive conditions to emerge over time.

Forward-Looking Time Frame

Unlike previous NIC global trend reports, the title of the latest report does not reference a year (the previous edition was *Global Trends 2030*) because the staff believes this conveys a false precision. The report explores both the next five years and the “long-term,” which spans the next several decades.

Leadership Involvement

Senior people in several agencies are involved in producing the report. The Strategic Futures Group formally presents its findings to the White House in the early months of a new Administration. They do not push their work on other parts of government, but respond to requests that typically come from high levels of the intelligence community, the State Department, Department of Defense, the National Security Council, and other parts of government.

Integration into Planning and Management Processes

The Strategic Futures Group is not involved in policy formulation or politics. It simply works to develop evidence-based trend information for others to use.

Conclusions and Broader Observations

While the NIC’s Global Trends reports have a global focus, there is much in them that is relevant to horizon scanning and scenario development in other agencies. For example, *The Paradox of Progress* addresses topics such as the aging population in Western nations, the likely continuation

of slow economic growth making it harder to meet challenges, the disruptive impacts of emerging technologies, and the growing role of networks of state and local governments, private actors and NGOs.

The Paradox of Progress analysis begins to move toward a global Systems approach that examines interactions of earth systems (lithosphere, hydrosphere, atmosphere, biosphere) with human systems (technology, society, economy, politics). While this kind of systems approach is difficult, looking at the world piece by piece cannot capture what is occurring. For example, if something is just cast as an environmental problem, its importance may be seriously underestimated and it will fail to energize the nation's security-related institutions. But in reality human-caused environmental degradation is driving a broad range of interacting societal problems. Presenting that bigger picture can mobilize action.

NIC staff are available to make presentations on *The Paradox of Progress* to people in civilian agencies and national-security related units of government. They are willing speak at meetings of the Federal Foresight Community of Interest. They also are available to do training sessions on methods they use, including key assumptions checking.

Office of Management and Budget - Executive Office of the President

There have not been any significant strategic foresight efforts conducted within the Office of Management and Budget (OMB) itself, although there has been long-term planning focused on diversity and workforce recruiting.

The best potential role for OMB is to help agencies optimize implementation of their own missions by encouraging the use of foresight throughout the Federal government. OMB is starting conversations on how foresight can help increase performance and would welcome input on specific roles it could play to help make foresight a systematic and routine process, including possibly coordinating a cross-agency strategic foresight effort.

The roles of OMB and the Executive Office of the President (EoP) have been to support strategic planning, which suggests potential roles they could play in strategic foresight. Planning is typically done by inching out from what is being done now rather than thinking about longer-term goals and challenges and what can be done in the near term to help meet them.

OMB has led a working group for strategic planning leads of different agencies where external experts have briefed key concepts and different agencies have shared how they applied these concepts. There have been sessions on setting long-term strategic objectives and thinking through the policies and actions needed to achieve those objectives. A recent working group session focused on logic models, focusing on ways to think strategically by identifying what needs to be accomplished to reach goals across a variety of future conditions.

OMB interviewees personally thought that strategic foresight can play a major role in Enterprise Risk Management (ERM). ERM reviews are codified and currently focus on near term threats and issues. Foresight can be engaged in risk reviews to look for emerging long-term threats and opportunities and a broader range of developments that can enhance an agency's ability to meet its objectives. OMB's Circular A-123 Revision asked agencies to differentiate between threats/opportunities that they are facing now versus those they will face years from now. Some agencies did not make the distinction while others recognized why this was being asked. OMB could put more emphasis on identifying long-term risks and opportunities.

An emphasis on performance management has sometimes been used to forward cast to priorities in planning. While performance information may indicate a presence or lack of efficiency or effectiveness, it does little to inform an agency's long-term strategic needs and priorities. Foresight can help clarify strategic priorities.

Brainstorming options for future OMB interagency engagement on strategic foresight has led to a suggestion that OMB could consider creating more demand for foresight by requiring agencies to report their findings; however, it would be incumbent on OMB to use this information. OMB also could be more prescriptive and require agencies to conduct foresight. Under either approach, however, agencies may not take foresight work to heart if they see it as just “checking off a box” for OMB.

An alternative option - OMB could operate as a “foresight hub” with spokes to each agency (e.g., through the Performance Improvement Council or other such government-wide, OMB supported forum). OMB could help give foresight legitimacy, set expectations, foster networking, and arrange for training workshops. The results of the interagency forecasting efforts could be relayed to each agency, but each agency must translate those findings into actions that are applicable to that agency. To have agencies implement strategic foresight well, their people must be involved.

The interviewees had the sense that agencies have significant differences in their willingness to conduct strategic foresight. It is currently practiced most successfully in non-civilian agencies. In a threat-based environment, issues involving emerging risks and uncertainties naturally demand attention. In many cases, senior leadership is exposed to foresight as they rise through the chain of command. In civilian agencies, the greatest openness to strategic foresight is in agencies where circumstances frequently change and policies are constantly being revised.

Office of Net Assessment

Organization/Resources

The Office of Net Assessment (ONA) is part of the Department of Defense (DoD) and reports directly to the Secretary of Defense. ONA's mission is to inform the Secretary about warfare issues that might occur in the future. ONA looks at how other nations' militaries are advancing in technology, and other potential changes in regional and global circumstances and explores how the military might fare against other countries in specific future warfare scenarios. ONA raises questions for consideration, such as are we buying/developing the right kinds of equipment? Are there new missions for which we need to develop capabilities? ONA does not provide recommendations on how to address such issues; they just make the Secretary aware of the issues.

There are approximately eight to ten full time analysts at ONA, a mix of active duty military officers and civilians. ONA has a budget of \$15-20 million per year to fund studies, language translation, war gaming, and other activities. Studies and activities by large organizations like RAND and Booz Allen are funded, as well as work with smaller consultants. ONA also opens solicitations for proposals, including an "open" category for ideas that do not fit in any conventional categories.

Foresight Methods

ONA was not originally charged with strategic forecasting. They "backed into it" because they found they could not trust forecasts from the National Intelligence Council, the World Bank and other sources.

ONA's scanning focuses on identifying discontinuities, divergences, and unexpected possibilities - things others are not looking at. They develop scenarios and build them in to war games that are usually played by 25 to 40 people on two or four teams. In most cases they are trying to explore operational-level military problems, and a scenario is useful in starting the game. The scenarios they use in most cases are short and simply set the play so that it focuses on the right operational problem. It doesn't need to do more than that.

Forward-Looking Time Frame

ONA looks out 20-25 years because it takes a long time to procure major new weapons, vehicles and other equipment for the military.

Leadership Involvement

When there is something important to share, it is shared directly with the Secretary or other senior officials who might find it useful.

Integration into Planning and Management Processes

ONA does not routinely participate in the Quadrennial Defense Review, the Defense Planning Guidance or any other military planning activities. Its tasking is rather broad and is coordinated with the Secretary of Defense.

Conclusions and Broader Observations

ONA is unique with its tight focus on unexpected possibilities and its focus on helping a single Department leader or a very small set of senior officials. The State Department's Office of the Chief Economist under Secretary Hillary Clinton had a similar role, but this kind of approach is rare in government.

Based on ONA's experience, they believe the following observations are relevant for others performing foresight.

- If funding is available, use a range of consultants and forecasters. They keep using some contractors who continue doing excellent work, but switch to other contractors frequently to get different perspectives.
- To explore possibilities others are not considering, make use of bright eccentrics, divergent thinkers from universities, small organizations, or wherever you can find them – generally “people who don’t wear suits.”
- Create your own scenarios and don’t make them too complicated.
- Conduct several games with different scenarios and parameters instead of one big game.
- Examine history to help understand current developments and future trends. Study at least as far back as you are trying to look forward.
- It is often very helpful to focus on helping a single customer or a very small group of customers, which clarifies the analytic perspective and helps to raise management issues rather than general observations about the future.
- Continuity of effort is very important: even very large, very complicated questions can be answered with sustained effort. People often overestimate what they can do in one year and underestimate what they can do in ten.

Office of Personnel Management

Organization/Resources

OPM created a Foresight and Methods Division four years ago that developed strategic foresight methods, provided training, performed consulting and organized an internal foresight book club. As the program developed, it began to reach outside the agency to explore the potential to instill foresight processes into human resource planning throughout the Federal government. There were four people involved but he is now the only person working on foresight. Personnel changes led the program to go quiescent over the past year, but it is currently beginning to operate again.

For three years, 0.5 FTE was devoted to foresight for part of each year. Extensive use also was made of volunteer participation from within OPM and other agencies. The program was in large part topically driven by what the agency's customers (from outside the agency) wanted.

Foresight Methods

Environmental scanning was the major method used: an environmental scan on jobs in the future workforce was done involving 50 people from across government. Limited use was made of scenario-planning using a set of three scenarios. The goal was to work interactively with customers to help them imagine different futures and the challenges and opportunities these future circumstances could bring. At the end of its third year, the program was beginning to work with the futures program at the University of Houston, which has a six-step forecasting process. In all these activities there was an effort to encourage customers to view strategic foresight as essential for strategic thinking and strategic planning. OPM held a "Future of Work Summit" in 2017 with more than 70 participants, with about 30 attending an interactive workshop offered after the main session.

Forward-looking Time Frame

The scanning and scenario development exercise had a 10- to 15-year time frame.

Leadership Involvement

When the strategic foresight work was in full swing, OPM's Associate Director was highly supportive and convinced members of the agency's Chief Learning Officer Council to participate in the process.

Integration into Planning and Management Processes

No tie was developed to strategic planning within OPM. They would like to push foresight out to the broader human capital community at OPM. He would also like to participate in more cross-agency foresight efforts.

Conclusions and Broader Observations

In periods when strategic foresight is reduced or 'flattened' in Federal Agencies it will be vital to keep in mind the immense value strategic foresight can add and to persevere through these down times, continuing whatever level of work is possible, and continuing to teach colleagues, knowing that foresight will be resuscitated. Essential to perseverance is preparation. Be prepared to respond and act upon any foresight request/opportunity that may present itself- in whatever form that might take. Get a Strategic Foresight certification, stay connected to others involved with foresight, and stay as current as you can in the field. Most importantly, remain curious and inquisitive and keep looking ahead yourself.

Project on Forward Engagement

The Project on Forward Engagement was established in 2001 by Leon Fuerth to explore methods for incorporating systematic foresight into the US Federal policy process and for configuring government systems to handle challenges that are “complex” (rather than just “complicated”). It has integrated a variety of methods into the concept of “Anticipatory Governance.” The Project is non-partisan, non-profit, and policy-neutral. It is exclusively concerned with the systems and processes by which policy is produced and integrated. The Project has been supported by the John D. and Catherine T. MacArthur Foundation, the National Defense University, the George Washington University, and the Rockefeller Brothers Fund.

An important insight from the Project is that strategic foresight is as much a mindset as an institutional arrangement. The U.S. has a history of undertaking long-range actions to benefit the country even at the expense of short-term costs. Examples include the GI Bill to make it possible for veterans returning after World War II to get a college education, creating land grant universities, financing a trans-continental railroad line, building the Panama Canal, purchasing Alaska, and creating an international financial system after World War II. We’ve gotten to where we are thanks to decision making based on foresight. It’s important to try to revive that kind of thinking.

Another insight from the project is the crucial importance of networking. The Federal Foresight Community of Interest is a good beginning. Starting from there, people working on strategic foresight in individual agencies can “network like crazy,” looking for ways to coordinate with other agencies in areas where their concerns intersect and developing networks that bring knowledge and resources from multiple agencies to bear on preventing and solving problems.

An example is the possibility of a continuing breakup of Arctic ice. The U.S. is not effectively planning for this and Russia has many more icebreakers available than the U.S. As a result, Russia is in a much better position to dominate the region. What if an increasingly ice-free Arctic becomes a primary channel for worldwide trade, replacing the Panama Canal for much ship traffic, and Russia controls the area? Melting ice and permafrost pose a wide range of issues, from fishing rights and the relocation of native populations to releases of methane into the atmosphere. An issue like this can’t be addressed from the resources and perspectives of a single agency.

More broadly, climate change is an important area for strategic foresight and cross-government coordination. There does not have to be agreement about human impacts on climate to justify some amount of action. One approach to consider is to work with the different Armed Services. Leaders across the Armed Services know they need to plan for the impacts of climate change on the nature of operations, design capability of equipment, frequency of maintenance, training requirements, etc. For example, the Navy will need to plan for impacts on domestic and foreign ports. The US military will have to undertake measures designed to assure its ability to fulfill its missions under seriously

altered operational conditions. There will be no **valid** way to design these measures without acknowledging that they are the product of human induced climate change. To do otherwise would risk that the measures we undertake will be overwhelmed by the consequences of our failure to address the role of human behavior as a prime mover behind the challenge.