

Lessons Learned in Resiliency – Strengthening International Nuclear Security Cooperation

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Abstract

The US Department of Energy’s National Nuclear Security Administration’s Office of Global Material Security (GMS) assessed the degree to which the program exhibited resilience during the global COVID-19 crisis. GMS established a cross-program team, the GMS Resiliency Working Group (GRWG), to review the actions GMS took during the pandemic, identified the strengths and weaknesses in GMS’ ability to deliver on its mission and make recommendations to improve GMS’ resiliency. The assessment viewed impacts through multiple lenses including ability to be effective in networking and relationships, technical consultations, training, and exercises; sustainability, maintenance, and repair; and implementation of security upgrades.

The analysis examined the evolution of the measures taken through the successive stages of the crisis to understand impact and effectiveness through the timeline of response. This presentation will provide an overview of the significant findings of this analysis and a summary of recommendations to improve day-to-day operations and future resiliency. These recommendations will help GMS anticipate and plan for the needs that are likely to emerge as the world moves toward the “new normal” post-COVID-19. Importantly, it also will inform how to optimize hybrid (virtual and in-person) approaches with partners to achieve mission goals more effectively and efficiently – and to ensure robust resilience to major disruptions in the future.

Overview

In early 2020, the COVID-19 pandemic rapidly began to impact the global community at all levels – from individuals to the national level to reach an international footprint. As a result, the Global Material Security (GMS) Program of the United States’ National Nuclear Security Administration immediately became challenged with continuing its mission to collaborate with domestic and international partners to prevent nuclear and radiological terrorism. National and state guidance required that individuals abruptly and immediately begin to work remotely as much as each job would allow. GMS was forced almost overnight to figure out how to execute its mission remotely.

At the beginning of the pandemic, the duration of disruption was unknown, but the general expectation was that work would return to normal in 3 to 4 weeks. As we all now know, the

world was unprepared to deal with a large-scale deadly pandemic. The requirements to conduct work remotely ultimately extended well over a year in the US and elsewhere. Travel, the lifeblood of the GMS work, essentially reached a standstill. As of this writing, GMS is still working under restrictions, although some in-office work and mission critical travel is now permitted.

GMS incrementally adjusted its typical way of doing business to adapt to a 100% telework posture. It established creative ways to accomplish its mission and engage with both its domestic and international partners. Importantly, it also leveraged that understanding and tools to engage within GMS, even though everyone was working from home.

While a global health pandemic is the current challenge, GMS also understands that future events could also cause massive disruptions, whether from a natural disaster or a human-caused incident. The GMS Resilience Working Group (GRWG) was chartered to evaluate how the organization reacted to the pandemic to better understand how to build resilience for the future. The GRWG also explored the stages of the response to recognize the opportunities and the challenges that occur at each stage. This perspective helped delineate how needs evolved as this crisis unfolded. This knowledge will help GMS react more rapidly and effectively during future crises.

Objectives and Approach

There were three Objectives established in the charter of the GRWG. The first was to review the capacity and actions taken by GMS during the pandemic to fulfill its mission to establish a baseline understanding of its ability to respond during the COVID-19 crisis. The “baseline” was not an assessment of effectiveness, nor was it to supply recommendations. Its purpose was to provide information on the adaptations GMS made and to provide an assessment of the overall ability of GMS to implement its mission. The second step included collecting and assessing the key results from the baseline and then conducting a survey to validate the information collected to represent the baseline with members of GMS. Finally, the survey results were described to focus groups, who were then elicited to make recommendations to GMS leadership on strategic steps that would maximize future resilience and inform a post COVID right sized hybrid approach.

Baseline Study

Baseline Approach and Development

To develop a baseline, sub-mission area working groups were convened to capture measures taken by GMS (adaptations) to execute its mission during the pandemic and gauge its ability to meet performance indicators:

- Networking/relationships - *GMS must be able to sustain existing relationships with its partners (interagency/domestic/international), proactively engage stakeholders, and recruit new volunteers.*
- Technical Consultations - *Technical consultations can be conducted and facilitate an exchange of information and resources between GMS and external organizations.*

- Implementation, Acceptance Testing, Assurances - *GMS has the ability to implement physical upgrade work and to conduct site assessments, performance testing, and assurances following completion of work.*
- Training and Exercises: *Human Resource Development (HRD) continued through training, exercises, and other capacity building efforts*
- Sustainability, Maintenance and Repair: *GMS maintained an acceptable level of system operability and to address both routine and emergency maintenance needs.*
- Partner capacity and analysis of tools: *GMS partners have adequate capacity to continue work, has adequate tools to engage remotely and is willing to use those tools.*

These groups focused exclusively on outward facing applications, so internal processes and communications were not covered. A subgroup to address approaches and measures to assess effectiveness was subsequently formed. Because of the strong overlap in approaches and required solutions, “Technical Consultations” was combined with “Training and Exercises.”

Baseline Results

Results were collected within each of the sub-mission area working groups. As expected, the responses were reflective of the interests and experience within each subgroup.

Networking: there were numerous effective outreach efforts and meetings conducted to sustain existing relationships. GMS was also surprisingly successful at building new partnerships during this period, but it still proved more challenging in a remote environment. Recruiting volunteers for upgrades was more difficult and many sites opted to postpone. GMS found that as it became more proficient using virtual platforms its outreach/messaging was actually amplified.

Technical consultation: GMS did well, using various virtual platforms and techniques to further research projects and to enable regular consultations and demonstrations. Technical sophistication of the tools clearly progressed throughout the year and creative means were applied to addressing barriers (examples include new methods of translation and providing virtual ‘eyes on’ demonstrations). It was noted that some consultations could not take place due to need for hands on demonstrations, sensitive information, etc. As a result, it was not clear how to determine the degree to which missed opportunities impacted the quality of technical consultation.

Training and Exercises: The three GMS Offices excelled at implementing and further developing platforms and curricula for both synchronistic and asynchronistic (e-learning, learning management platforms) training and exercises. All offices focused on adapting training materials and styles to virtual learning environments and invested in expanding these resources. Nevertheless, some training was much more difficult including more advanced training modules and/or vendor specific equipment familiarization. This included challenges in “train the trainer” effort. There were many platforms used and the approach to using them varied across GMS. GMS offices also applied different post-training evaluation processes.

Implementation, Acceptance Testing, and Assurances: GMS had varied success in implementing actual upgrade work, but after a few months, both the Offices of Radiological

(ORS) Security and Nuclear Smuggling Deterrence and Detection (NSDD) developed a systematic approach to conducting remote acceptance testing/assurances. There were also examples of innovative approaches to “keeping eyes on the prize without boots on the ground”. NSDD was able to rely on in country resources and foreign sub-contractors. The Office of International Nuclear Security (INS) had a higher hurdle due to sensitivity of information but was also able to use forward deployed resources such as the Science Centers to advance some of its work.

Sustainability, Maintenance, and Repair: There was mixed success across GMS. Some work was achieved through heavy reliance on third party contractors. However, in-person sustainability visits initially ceased so there was a gap in information on the state of operability of systems. Lack of connectivity for sites to conduct remote assurance and sustainability visits was a barrier, as was information sensitivity. In 2021, GMS began conducting some remote sustainability assessments.

Partner Capacity and Tools: Partner capacity and willingness to engage remotely varied a great deal. Establishing new engagements through virtual means was more challenging than continuing existing relationships. As would be expected, the pandemic created competition for resources and political attention. Infrastructure capacity was a real problem for many of partners – and for GMS – as were technology failures and lack of experience with virtual platforms. Working across multiple time zones was also a challenge.

Summarizing and articulating cross-cutting observations from the entire suite of responses, the baseline identified some overarching positive outcomes where GMS evolved to better manage the pandemic impacts. These were cultivation of in-country resources and new partnerships; expanded inclusivity and outreach, increased regularity of contact, application of innovative technical solutions helped despite no “boots on the ground,” and investments in training/tabletop exercise resources increased, overall. The unmet challenges included: lack of boots on the ground for those efforts that could not be addressed virtually resulting in an inability to do some types of work. As expected, dealing with COVID limited bandwidth and availability of staff. Informal engagements critical to building relationships were missing and training/technical consultations not always as effective virtually as they would have been in person. Also, the increased pace and other concurrent stressors due to pandemic constraints led to pervasive burn out for nearly all participants.

Survey and Key Findings

Baseline observations drove survey questions. The intent was to develop data that would allow the GRWG to compare and confirm observations across GMS offices and across federal employees versus lab staff, to validate – and potentially fill gaps – in the baseline findings, and to create the basis for assessing priorities and drivers. The survey incorporated responses from 184 individuals in GMS: forty-one responses from federal employees and 143 from Labs and Contractors supporting GMS.

Overall, the members of GMS were generally proud of their teams' ability to adapt and respond in crisis. There were many positive outcomes that could be leveraged into the way GMS operates in the future. There were also a number of gaps and challenges that were identified as needing to be solved.

Words that showed up throughout the GRWG study were “flexibility,” adaptability,” “creativity,” “communication” and “teamwork” (Figure 1). Overall, these characteristics of program participants – internal and external – were viewed to be the most crucial underpinnings of resilience. Building on the trust and patience of all people involved in the program who all enabled dynamic change and innovative solutions kept GMS in the game.



Figure 1: This word cloud shows the frequency of terms captured in the survey as being supportive of GMS resilience during the pandemic.

Most respondents said that, in addition to creativity and innovation, the degree of maturity of relationships among teams and partners was the one of largest contributing factors in effective virtual engagement (Figure 2). In fact, virtual meetings brought a welcome casualness and lowered the barrier to meeting with partners—at times fostering even deeper relationships and wider participation. On the flip side, going virtual lowered the barrier to convening meetings, which meant a *lot more* meetings. Not only were there more meetings, but because of the international span of partner locations, meetings ran a completely unsustainable 24-hour cycle. For those things that required hands-on field work, GMS eventually developed hybrid methods to conduct maintenance and sustainability work. One method proven to work involved constructing key elements of a system, shipping it to a partner location, then guiding installation and testing with on-site contractors and/or through virtual support sessions. However, concerns were raised that GMS experts need to maintain competency though conducting at least occasional fieldwork. Also, there was value in performing in person acceptance testing. Managing virtual access to sensitive locations and sharing sensitive information virtually was also identified as a concern.

Communication gaps were also identified within GMS itself. The survey found that the learning curve on ways to manage the crisis and to deploy virtual tools could have benefited from more cross-sharing between offices. While the individual programs are quite different and do not normally have a strong dependency on each other to “do business” – in a crisis, the needs were

similar, but the adaption efforts were diffuse. There was also an unexpected gap in the perception of “effectiveness” of mission delivery between the federal employees and lab staff.

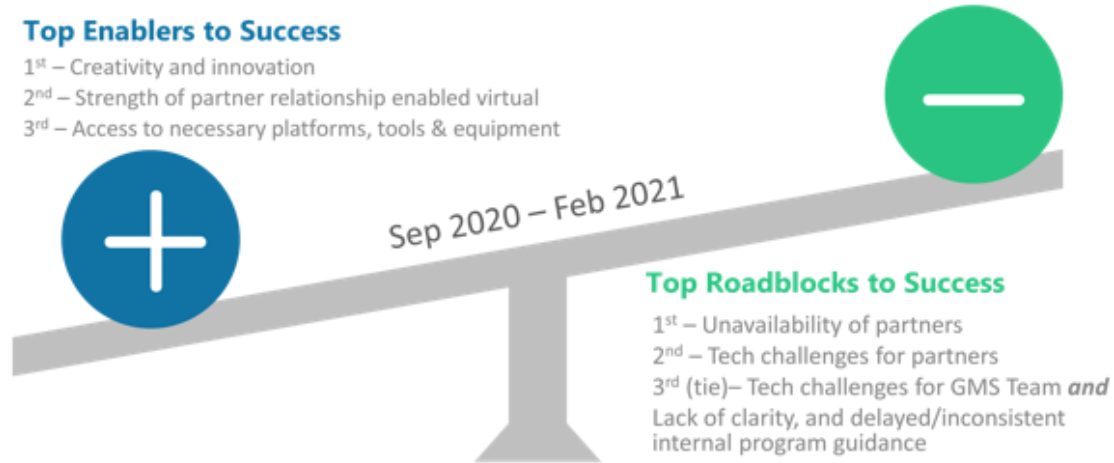


Figure 2: Top enablers and roadblocks to success, as identified in GRWG survey.

Focus Group Observations and Recommendations

Using the baseline and the subsequent survey as background, small group and break-out sessions in four areas were assembled to elicit views concerning the effectiveness of GMS actions and develop recommendations for GMS to further resilience. The four focus groups were like the earlier baseline subgroups and included: Networking and Relationships; Training, Exercises, and Technical Consultations; Sustainability, Maintenance, and Repair; and Implementation, Acceptance Testing, and Assurance.

GRWG Recommendations

| Key Cross Cutting GRWG Recommendations |
|---|
| <ul style="list-style-type: none"> • Continue to optimize culture of agility and innovation through future practice, leveraging positive lessons learned to improve post-COVID day-to-day operations and future resilience. • Enhance information sharing across GMS Offices and with and among Labs. • Anticipate and actively plan for the next steps post-COVID and for future disruptions, |

In Spring 2021, the GRWG provided a suite of recommendations to the GMS leadership team for consideration. The recommendations were parsed into near-, intermediate, and long-term actions.

In the near-term, the focus groups recommended:

- *Establish a GMS-wide supported suite of virtual engagement tools and improve information integration.*
- *Encourage and create a mechanism to support cross GMS information sharing on sustainability and training approaches and efforts.*
- *Develop informed and consistent path forward for transitioning to new normal post-COVID*

In the intermediate term, the focus groups recommended:

- *Evaluate and determine the optimal hybrid engagement model balancing in person versus remote engagement.*

Finally, in the long-term, the focus group recommended:

- *Build organizational resilience to future disruption.*

After review of the GRWG report, GMS leadership prioritized follow-up actions and is in the process of rolling these out across GMS.

Crisis Stages in the Pandemic

As the GRWG looked at developing a “baseline,” it became obvious that perhaps a single baseline was not a meaningful way to describe what occurred as the pandemic surged across the world. In fact, what we experienced were several stages, each of which reflected different challenges and associated levels of program success. The GRWG identified 6 stages that are likely generalizable to other crises (Figure 3). Thus, the model highlights the opportunity to predict the next stages and better plan efforts. The model also creates a template for resilience, helping prepare for the next major disruption to manage our efforts more effectively.

The “Initial Shock” Stage was characterized by very abrupt, but very uneven national, regional and global crisis response measures as the world slowly recognized the scope and potential impact of the COVID-19 pandemic. Most people and governments were in a state of shock. Travel and in-person activities were largely halted, and other public health and safety measures were instituted – again, inconsistently. Partner countries also went on lock down. Communication within and outside of the program essentiality ceased and staff were instantaneously transitioned to telework - with varying degrees of effectiveness. It was extremely difficult for everyone to gain their bearings in this strange new world.

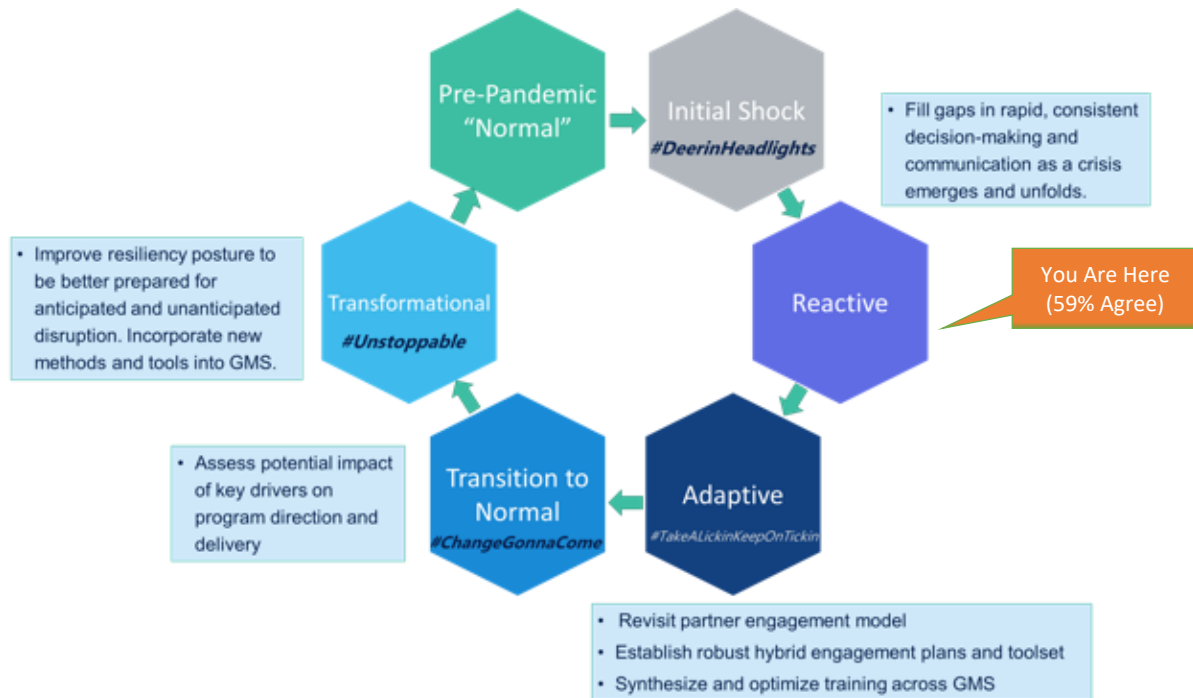


Figure 3: Stages of resilience. Most survey respondents agreed that GMS is in the Adaptive Stage of Resilience.

The onset of the pandemic became widespread, and individuals started to become resigned to the fact that there was a crisis, however, in the “Reactive Stage” most people and institutions believed that the duration would be very limited and that “business as usual” would begin in a matter of weeks, or maybe a few months. There was a gradual and uneven slowdown of planned efforts. The situation was fluid and top-down communication was critical. This period was also the beginning of creative brainstorming to identify ways to continue to meet GMS’s mission through alternate work efforts and approaches that began to be pursued both internal to labs and at NNSA. These ideas and approaches were vital in keeping the mission moving forward.

The “Adaptive Stage” began as it became clear that the scope of the pandemic was widespread, the impacts were extreme, and duration was going to long term – requiring a near-term “new normal.” Internal and external communication improved. Priorities began to shift to ensure that achievable activities were funded and executed. Innovative solutions were implemented – mostly in the shift to remote engagement and redirecting funds toward meaningful work that could be continued in a telework posture. A challenge during this time was sustaining the initial enthusiasm as the pandemic dragged on into another year.

At this point in time, GMS is likely in the “Transition to Normal” stage. GMS must consider that national and international workforce is likely to return to work in uneven stages. The bow wave of work in some areas may overwhelm human and other resources. Different rules, mitigation measures, and infection rates in different countries will require creative mitigation strategies. To be successful, GMS must pursue flexible, anticipatory, and adaptive Program planning.

Ultimately, for GMS to reach the Transformative/Anticipatory Resilience stage it must take the lessons learned during the pandemic to inform strategies for anticipatory resilience as well as leverage such lessons to optimize GMS steady state engagement model. Identifying the optimal hybrid approach is critical to bouncing forward instead of just bouncing back. Preparedness and planning are also crucial underpinning to building resiliency.

Summary

Despite the obstacles created by the pandemic, GMS was able to adapt and find creative means to continue its efforts to improve nuclear/radiological security and counter nuclear smuggling. The last year and half have undoubtedly changed GMS engagement model as it transitions into the post-Covid new normal. Moreover, having learned from this experience, GMS will be better prepared in the future to deal with disruptions.

As GMS, along with its partners, are all moving through an uneven and prolonged transition to the new normal; identifying and pursuing efforts to benefit of resilience in the long term will ensure the GMS mission continues to be achieved. Leveraging lessons learned during the pandemic will enable robust mission delivery. During this transition, GMS leadership is committed to continuous improvements that will strengthen resilience and optimize its critical nuclear security collaboration.

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