



N. Al-Alami, R. Hong, M. Wright General Dynamics Mission Systems T4.5-385



GENERAL DYNAMICS

Mission Systems

PUTTING AN END TO NUCLEAR EXPLOSIONS

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Agenda

- General Dynamics Mission Systems (GDMS) Overview
- Problem and Challenges
- USIMS COVID-19 Response
- Lessons Learned

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General Dynamics Mission Systems Overview

- Equipment manufacturer for automatic particulate sensor Radionuclide Aerosol Sampler / Analyzer (RASA)
 - 21 installed RASA sites in the IMS (23 planned)
- Station Operator for the 11 US IMS RN stations and RN66
 - 12 RN Particulate RASA sites
 - 5 RN Noble Gas SAUNA sites
- Sensor Operations Center
 - Daily team "stand-up" meeting
 - Provides immediate problem coordination, response & notification
 - Provides liaison with local operators to troubleshoot & resolve problems
- Location: Chantilly, Virginia, USA
 - RN Engineering Test Bed and GDMS Staff

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Problem

Due to COVID-19, we faced new challenges to support the US IMS Radionuclide stations to meet IMS operational manual minimum requirements.

Challenges



Travel Restrictions

- Postponed maintenance visits
- Schedule delays for onsite projects



Supply Chain & Shipping Delays

• Vendors and manufacturers closed or reduced staffed



Office Restrictions

- Potential for complete office shutdown
- Equipment testing delays
- Added time and effort to locate information from coworkers



Team Well-being

- Social isolation
- Lack of face-to-face interaction for feedback and collaboration

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USIMS COVID-19 Response

GDMS implemented innovative strategies, procedures, and technology to ensure continuous support of the stations and local personnel supporting the mission.



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Sustainment & Forward Deployment Plans

In anticipation of **travel and shipping restrictions**, we:

- Implemented a remote spares depot at RN75
- Sent hot-swappable components to maintain system performance
- Shifted focus to testing equipment to increase deployable, critical depot spares

USX74 pumps failure Spare pumps on site RN70 filter jam No downtime USP75 MCA overload Spare advance motor on site Spare MCA on site 2 affected samples 1 affected sample USP72 router failure Spare router on site USX79 STU leak No downtime STU ready to ship 1 affected sample

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Refining QA Process

We are improving our **QA process** by reviewing the **software** and **hardware** components within our testbed.

- Updating testing documentation
- Reviewing and cleaning code
- Upgrading test rig hardware
- Creating blueprint to automate procedures



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Enhanced Training Material

We updated our **training repository** to support the virtual "new normal".

- Launched new remote training curricula
 - Live demo and review of procedures
 - Q&A session
- Initiated video production program
 - Instructional videos with closed captioning and voice-over narration
- Organized workshops
 - Recorded for future reference
 - Cover technical and program related information





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Remote Preventative Maintenance

Leveraging technology and available resources, GDMS created a **modified**, **non-invasive** maintenance plan to complete **remotely** with local support.

- On-call support for Local Operators during the PM
- Opportunity to pro-actively upgrade hardware and software
- All US stations remain fully mission capable. 15/15 >95% DA over the last 12 months.

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	lan-21	Eeb.21	Mar-21	Last 3 mo	Last 12 mo
	3011-21	100-21	14101-21	average	average
USP70	100	100	100	100	98.7
USP71	100	100	100	100	99.8
USP72	100	100	100	100	99.5
USP73	100	100	100	100	100.0
USP74	100	100	100	100	99.8
USP75	100	100	96.4	98.8	99.7
USP76	96.8	100	100	98.9	99.8
USP77	100	100	100	100	100.0
USP78	100	100	100	100	98.5
USP79	100	100	100	100	100.0
USP80	100	100	100	100	99.7
RASA Average	99.7	100	99.7	99.8	99.6
	1 21	E-1-01	Mar. 21	Last 3 mo	Last 12 mo
	Jan-21	Feb-21	Widr-21	average	average
USX74	100	100	93.6	97.9	98.1
USX75	100	100	95.2	98.4	99.5
USX77	100	98.2	100	99.4	97.1
USX79	100	100	100	100	99.6
SAUNA Average	100.0	99.6	97.2	98.9	98.6

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Team Well-being

Majority of team worked fulltime inoffice. Shifting to mostly remote was an adjustment and required more **transparency**.

GDMS provided the team with various options to **stay connected** and **maintain productivity**.



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Lessons Learned

Category	Positive	Negative	Improvements
Program Operations (no travel)	Maintained 95%+ DA	 System maintenance postponed Station infrastructure: small issues immediately addressed, previously delayed for scheduled maintenance In person coordination visits/meetings Schedule Delays for relocation efforts 	Keep remote PMs alongside in-person. Allows for opportunity to review on-site spares and maintain relations with LOs
Testbed	Created SAUNA SME group3D printer for prototyping	No proper tracking for lab equipment usageLab organization	Creating lab equipment reservation system
Training (LOs + Staff)	 Improving team's internal skillset Learning new skills such as video editing 	 Loss of in person engagement and opportunity to grow skillset as team 	 Workshops and trainings held more periodically. Allocate time for staff to create/present
Personnel	Team excited for hybrid working model	Challenges to maintain collaborative environmentMore meetings	Review team dynamics and restructure team accordingly.

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Thank you!

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