

**Radiological Contingency Planning for the Mars Science Laboratory Launch - 8508****P. P. Guss****National Security Technologies, LLC****P.O. Box 98521, M/S RSL-13, Las Vegas, NV 89183-8521****ABSTRACT**

This paper describes the contingency planning for the launch of the Mars Science Laboratory scheduled for the 21-day window beginning on September 15, 2009. National Security Technologies, LLC (NSTec), based in Las Vegas, Nevada, will support the U.S. Department of Energy (DOE) in its role for managing the overall radiological contingency planning support effort. This paper will focus on new technologies that NSTec's Remote Sensing Laboratory (RSL) is developing to enhance the overall response capability that would be required for a highly unlikely anomaly. This paper presents recent advances in collecting and collating data transmitted from deployed teams and sensors. RSL is responsible to prepare the contingency planning for a range of areas from monitoring and assessment, sample collection and control, contaminated material release criteria, data management, reporting, recording, and even communications. The tools RSL has available to support these efforts will be reported. The data platform RSL will provide shall also be compatible with integration of assets and field data acquired with other DOE, National Space and Aeronautics and Space Administration (NASA), state, and local resources, personnel, and equipment. This paper also outlines the organizational structure for response elements in radiological contingency planning.

**INTRODUCTION**

Scheduled to launch in the fall of 2009, Mars Science Laboratory is part of the National Space and Aeronautics and Space Administration's (NASA's) Mars Exploration Program, a long-term effort of robotic exploration of the red planet. Mars Science Laboratory (MSL) is a rover that will assess whether Mars ever was, or is still today, an environment able to support microbial life. In other words, its mission is to determine the planet's "habitability." The MSL rover will carry a radioisotope power system that generates electricity from the heat of plutonium's radioactive decay. This power source gives the mission an operating lifespan on Mars' surface of a full Martian year (687 Earth days) or more, while also providing significantly greater mobility and operational flexibility, enhanced science payload capability, and exploration of a much larger range of latitudes and altitudes than was possible on previous missions to Mars.

The U.S. Department of Energy (DOE) provides technical support to the requesting federal agency such as the Federal Bureau of Investigation, Department of Defense, NASA, or a state agency to address the radiological consequences of an event. These activities include measures to alleviate damage, loss, hardship, or suffering caused by the incident; protect public health and safety; restore essential government services; and provide emergency assistance to those affected.

Under a Memorandum of Understanding between DOE and NASA, an Advance Launch Support Group (ALSG) will be established to assist in any emergency radiological monitoring for NASA's MSL launch.

**MISSION OBJECTIVES AND CAPABILITIES**

The Remote Sensing Laboratory (RSL), located at Nellis Air Force Base, will provide a modified Consequence Management Response Team (CMRT), which will become part of the ALSG.

**Mission**

At the request of the NASA, the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) has directed that a modified CMRT, with personnel and associated equipment, be deployed in support of the MSL Launch, which is scheduled for September 2009 at the Kennedy Space Center (KSC) in Cocoa, Florida.

## Objectives

The objectives of the support afforded by the RSL are to integrate safety into every task; organize and deploy a modified CMRT as part of the ALSG; provide support to the Radiological Control Center (RADCC); provide personnel to support off-site field team operations; provide monitoring instrumentation to support off-site and on-site field teams; establish communications support directly connecting all locations: RADCC, local National Guard Armory (where ALSG is located), and Florida Department of Emergency Management Mobile Command Center, Brevard County Emergency Operations Center (BCEOC), and the Joint Information Center (JIC); maintain presence during launch opportunity; respond to any anomalies or emergencies; and archive data.

## ALSG Capabilities

The capabilities that the ALSG brings include radiological monitoring, sample collection and processing, graphic information systems (GIS), communications, training of responders, technical and operational expertise, health and safety of responders, medical guidance for radiological injuries by imbedding the NNSA Radiation Emergency Assistance Center/Training Site (REAC/TS), and secure, legally-accountable maintenance of data.

The purpose of support afforded by RSL is to coordinate, define, and organize all the radiological monitoring and assessment, logistics, and communications requirements for the ALSG, RADCC, JIC and BCEOC prior to the launch. In addition, the RSL will identify the necessary assets needed to meet the various organizational and overall mission objectives set forth in various plans. Main sites designated to receive NNSA and contractor support are listed in Table I.

Table I. Functional Group and Location of that Group.

<b>Function</b>	<b>Location</b>
Advance Launch Support Group (ALSG)	Cocoa National Guard Armory Cocoa, Florida
Radiological Control Center (RADCC)	Kennedy Space Center (KSC), Operations and Checkout (O&C) Building, KSC, Florida
Joint Information Center (JIC)	Kennedy Space Center (KSC), KSC, Florida
Range Operation Control Center (ROCC)	Cape Canaveral Air Force Station Cape Canaveral, Florida
Brevard County Emergency Operations Center (BCEOC)	BCEOC, Cocoa, Florida
U.S. Department of Energy (DOE) Emergency Communications Network (ECN)	DOE Washington, D.C.
National Operations Center (NOC)	Homeland Security Operations Center Herndon, Virginia
Florida Emergency Operations Center (FL EOC)	FL EOC
Remote Sensing Laboratory (RSL) Network Operations Center	RSL, Las Vegas, Nevada

This overall support will ensure quick and positive methods of communicating information pertaining to the radiological assessment, field monitoring, and the reporting of any urgent developments directly related to an unexpected radiological release between the ALSG, KSC RADCC, JIC, and Brevard County Emergency Operations Center (BCEOC). In addition, it addresses the need to provide informational data to the DOE, the National Operations Center (NOC), and the Florida Emergency Operations Center (FL EOC) using the DOE Emergency Communications Network (ECN).

**CONCEPT**

To ensure continuity of information between first responders, supporting agencies, and field monitoring teams in the event of an accident related to the launch, a reliable communication path between all facilities and associated field monitoring teams will be needed. A common path will be provided via dedicated Ku Band satellite, wideband microwave 802.11 wireless, terrestrial, and radio frequency (RF) links, which will be installed and maintained by the RSL Communications Group (Figure 1). The path will provide the facilities with internet protocol (IP) voice, data, video, and video conferencing services. The path will also include Raw Internet and access to the Federal Radiological Monitoring and Assessment Center (FRMAC) Web, which resides on the RSL network, as well as connectivity to the NNSA ECN nation-wide data network via the Mobile ECN (MECN) satellite communications package. Informational data will be supplied via the MECN, Web access to the FRMAC Web and GIS Web Portals, and video conferencing using the ECN multi conferencing unit (MCU). RSL will resolve interoperability issues that exist between KSC and RSL radio systems. RSL may utilize existing Land Mobile Radios and traditional RF repeaters.

**RESPONSIBILITIES**

Under mutual agreement, the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office (NNSA/NSO) will provide the necessary systems and equipment from the RSL to meet NNSA mission requirements.

**Logistical and Administrative Instructions and Requirements**

The RSL Mission Leader will maintain accountability of all personnel and equipment under their control throughout the deployment. RSL planners will provide the following:

- Air transportation to Cocoa, Florida, for all RSL MSL mission personnel
- 53' open-sided flat-bed truck to transport equipment deployed to the Cocoa National Guard Armory
- 20,000-pound forklift to offload and load equipment pallets at the Armory
- Enclosed box trucks to transport and protect equipment
- Rental vehicles (minivans, cargo vans) for personnel and equipment transport
- Housing for all mission personnel
- Liquid Nitrogen
- Tables and chairs in the ALSG Center
- Equipment security during the off hours at the Armory

**Medical**

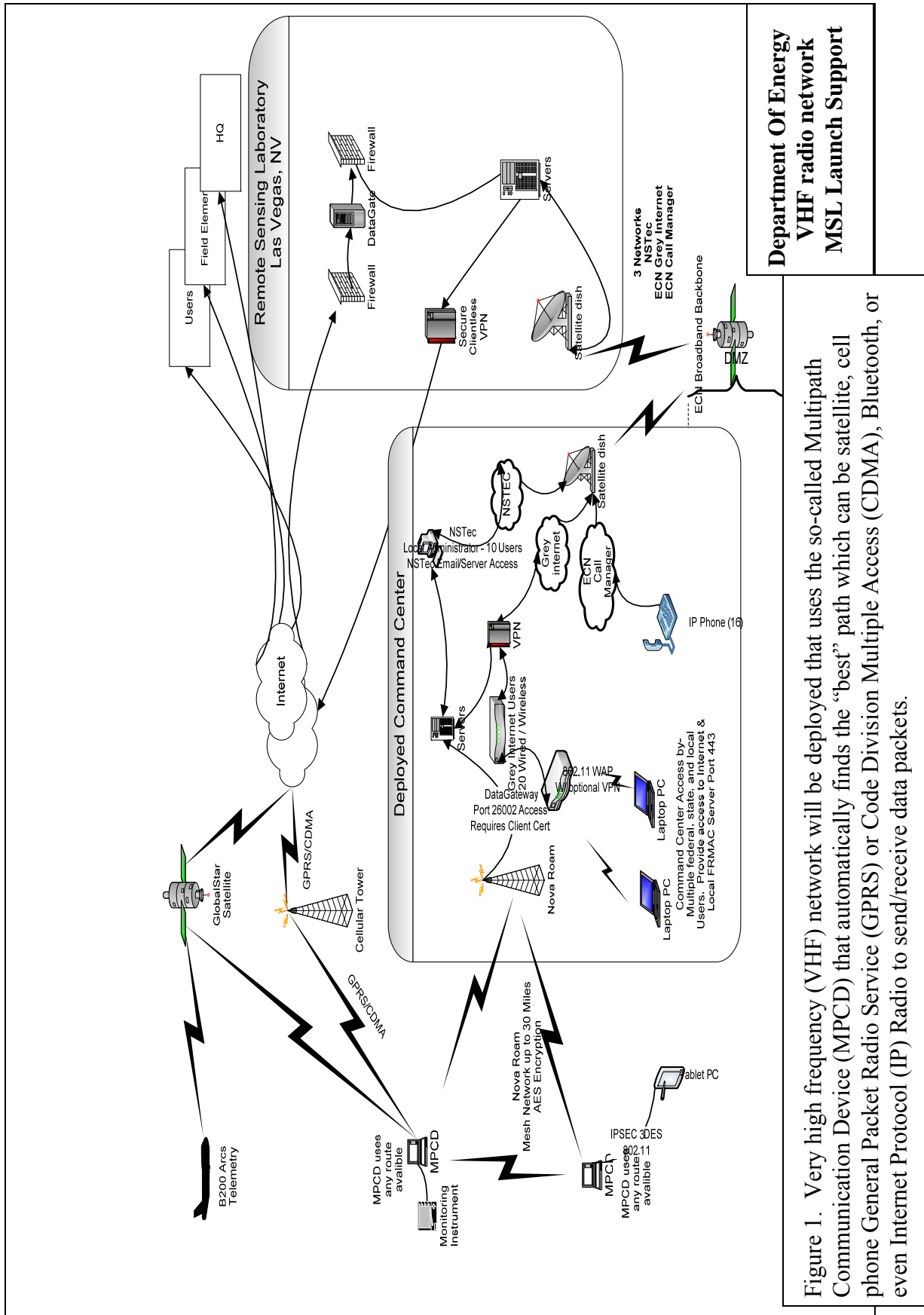
No medical personnel will be deployed on this mission. Access to KSC medical staff and facilities is available. Local medical personnel will provide any additional requirements for medical services, and local hospitals will provide emergency services. Mission personnel are responsible for deploying with an adequate supply of routine prescription medications.

**REQUIREMENTS**

The following listing reflects the site requirements and group responsibilities for providing required services that are expected for the MSL launch.

**Advance Launch Support Group (ALSG)****Cocoa National Guard Armory**

Logistics: Ensure the necessary building power distribution to support the RSL communications group and other various agencies located within the ALSG compound. Provide a secure storage facility for temporary storage of sensitive material and equipment, beginning on July 28, 2009, until the end of the launch support windows. Provide logistics and infrastructure support as needed.



Communications: RSL communications personnel will:

1. Establish a communications center to provide services to all federal participants and agencies.
2. Arrange the installation of debarkation points for local commercial telephone and lines at the Cocoa Armory.
3. Arrange the installation of debarkation points for local commercial DSL Internet Service Provider (ISP) at the Cocoa Armory.
4. Provide the ALSG with IP telephone capability with a 30 station line capacity
5. Provide a CM/FRMAC ECN satellite system with sufficient services (IP voice, data, and video/video conferencing) for drill/launch traffic.
6. RSL will distribute 30 hand-held radios, mobile base stations, and if required 3 very-high-frequency (VHF) repeated channels to NNSA and NNSA associated personnel at the ALSG location for exercises/drills.
7. A Tandberg compressed video system will provide full motion video links from the KSC via the NNSA MECN to video monitor positions at the ALSG communication center and to a video distribution console for distribution to other locations within the ALSG. These links will also provide video teleconferencing capabilities between the ALSG and RADCC and other agencies and facilities.

#### **Radiological Control Center (RADCC)**

##### **Kennedy Space Center:**

KSC:

KSC personnel will:

1. Provide sufficient working space, chairs, tables and other building furnishings as indicated in the KSC plans.
2. Provide the necessary building power distribution to support the various agencies located in and around the RADCC.
3. Provide either direct video feeds or access to direct video feeds from various launch sites and RADCC video sources.
4. Provide an interconnect terminal block for RSL radio base station to the RADCC radio console.
5. Provide an interconnect terminal block for access to KSC telephone system for point-to-point access to the ROCC.
6. Provide an Ethernet Transmission Control Protocol (TCP) / IP access to KSC local area network (LAN).
7. Provide access to the roof of the KSC Operations and Checkout (O&C) Building for the establishment of MECN platform and any other miscellaneous support requirements as listed in the KSC procedures and plans.

RSL:

RSL communications personnel will:

1. Provide the ALSG with IP telephone capability with an eight-station line capacity
2. Provide an ECN satellite system with sufficient services (IP voice, data, video/video conferencing) for drill/launch traffic accessing the FRMAC Web, GIS Web and NNSA ECN networks via satellite services.
3. Provide 50 hand-held radios to RADCC on-site radiological monitoring teams along with supporting base station interfacing for the KSC RADCC radio consoles and, if required, 3 VHF repeated channels to NNSA and NNSA associated personnel at the RADCC location for exercises/drills.
4. A Tandberg compressed video system will provide video conferencing links from the RADCC to the ALSG, JIC, and other participating agencies and facilities via the NNSA MECN.
5. Provide NNSA and federal agencies with VHF radios, facsimiles, and telephone instruments with NNSA dial-up and direct point-to-point IP telephone services between the ALSG and RADCC and other sites as identified.

**Cape Canaveral Range Operation Control Center (ROCC)****Cape Canaveral, Florida:**

KSC: KSC personnel will provide the necessary Ethernet interfaces for a point-to-point 56 Kbps or faster communications path between the KSC RADCC and Cape Canaveral Air Force Station (CCAFS) ROCC.

**Joint information Center (JIC)****Cocoa, Florida:**

RSL: RSL communications personnel will:

1. Establish an ECN communications link via Microwave or KSC provided terrestrial T-1 circuits.
2. Provide access to FRMAC Web and GIS Web products.
3. Provide video conferencing capability.
4. Provide 2 ECN IP phones.

**Brevard County EOC****Cocoa, Florida:**

RSL: RSL communications personnel will:

1. Provide connectivity to the ECN video conferencing bridge (MCU).
2. Provide RF base station with access to NNSA DOE RF networks.

**MSL RADIO NETWORKS**

RSL Communications will supply the tentative listing of the MSL radio networks that are to be used for the NNSA and NNSA associated radio communications. Networks will be supplied for Aerial Measuring System (AMS) NNSA aircraft, AMS tracking and data networks, off-site monitoring teams, NNSA off-site personnel, and U.S. Environmental Protection Agency (EPA) off-site monitoring teams.

All NNSA hand held and base station radios will be encrypted with the appropriate key to ensure voice privacy between the networks. Radio networks provided by RSL will be interfaced into the RADCC radio consoles as described in KSC procedures via a KSC provided interface terminal in the RADCC.

RSL will provide a telephone directory, which will be published with organizations desiring listings. The inside cover of these directories will contain safety, security, and communication procedures. This directory will be used as both drills and actual launch directories. An attachment will be published to the directory to support the additional telephone numbers associated with the Command Post drill's Simulation Cell.

**Trouble/Reporting**

A communications maintenance team will be on-site for an appropriate period before, during, and after the launch. A 24-hour call-in capability will be established to accept trouble complaints/calls and immediately assist the user if the problem appears to be one of improper operation or equipment malfunctions.

**SCHEDULE**

The following depicts the timeline for supporting the aforementioned venue activities (exact dates yet to be determined):

**23 July 2009 (N – 54 days)**

- ALSG load palletized and made ready for deployment.

**24 July 2009 (N – 53 days)**

- Tractor trailer arrives at RSL, pallets are loaded, and truck departs for Cocoa, Florida.

**27 July 2009 (N – 50 days)**

- An RSL advance team consisting of six Communications Specialists and one Mechanical/Electrical (M&E) Specialist will deploy to Orlando, Florida, via commercial air, pick-up rental vehicles, and drive to Cocoa Beach, Florida.

**28 July 2009 (N – 49 days)**

- RSL advance team arrives at the Cocoa, Florida, National Guard Armory and meets the equipment truck. Personnel will off-load the pallets and begin the communications setup. Personnel will also pickup two 16' box trucks and one 24' box truck that have been reserved, in addition to one pick-up truck that will also be picked up on this date.
- The Communications Specialists continue the communications set-up. The M&E Specialist will re-deploy to Las Vegas, Nevada, via commercial air.

**23 August 2009 (N – 23 days)**

- Two additional Communications Specialists deploy to Orlando, Florida, pick-up rental vehicles, and drive to Cocoa, Florida.

**24 August 2009 (N – 22 days)**

- The two additional Communications Specialists report for work at the Cocoa, Florida, National Guard Armory and rendezvous with the advance team to discuss the setup and view the applicable locations.
- The MSL Communications System is now set-up and operational.

**31 August 2009 (N – 15 days)**

- The six advance team personnel re-deploy to Las Vegas, while the two additional Communications Specialists remain in Cocoa to maintain the communications system until the main party arrives at the armory on September 3, 2007. Two air sampler/radiation detector technicians arrive at KSC to begin calibration of air samplers and detectors.

**02 September 2009 (N – 13 days)**

- The RSL main party (36 people), including the ALSG equipment, and three NNSA/NSO personnel, will deploy to Orlando, Florida, via commercial air. Upon arrival in Orlando they will pickup rental vehicles, drive to Cocoa Beach, Florida, and check into hotels.

**03 September 2009 (N – 12 days)**

- ALSG setup begins at the Cocoa National Guard Armory.

**04 September 2009 (N - 11 days)**

- All Mars Launch participants will participate in three days of field team training.

**07 September 2009 (N - 8 days)**

- All Mars Launch participants will participate in a one-day full launch drill.

**08 September 2009 (N - 7 days)**

- Crew Rest Day.

**09 September – 13 September 2009 (N – 6 through N-2 days)**

- Spacecraft Pad Operations Support (modified on-site staffing).

**14 September 2009 (N – 1 day)**

- Crew Rest Day (all personnel on one-hour recall).

**15 September 2009 (Scheduled Launch Day)**

- Scheduled MSL Mars Launch. Launch opportunity is 15 September to 8 October 2009, mid-afternoon time frame.

**09 October 2009 (N + 1 day)**

- Teardown ALSG and begin building pallets. Communications Specialists begin dismantling the communications system.

**10 October 2009 (N + 2 days)**

- All RSL Mars Launch mission personnel and ALSG equipment re-deploy to Las Vegas with the exception of the Communications Specialists, M&E Specialists, Operations Specialist, and other key personnel involved in wrap-up activities.

**13 October 2009 (N + 5 days)**

- Truck arrives at Armory, pallets are loaded, and truck departs for the RSL.

**14 October 2009 (N + 6 days)**

- Remaining Mars Launch mission personnel re-deploy to Las Vegas.

**15 October 2009 (N + 7 days)**

- Equipment truck arrives at RSL.

Items pertaining to frequency coordination, radio tower space procurement and setup, telephone private automatic branch exchange (PABX) installments, and site selections will be done prior to the start of the drill and launch windows. The NNSA communications assets at the Cocoa Armory and KSC and other facilities will be in place and operational prior to, during, and after the expected time frame of the drill/launch. Establishment of commercial telephone and DSL ISP services to the ALSG will be required no later than 30 days prior to equipment arriving on-site at the ALSG. KSC telephone service at the RADCC, for connection to the ALSG, is required by July 30, 2009. Communications and support equipment from RSL facility in Las Vegas, Nevada will arrive at the Cocoa National Guard Armory no later than July 28, 2009. All communications systems associated with the Armory activities will be required to be operational no later than August 24, 2009, for drills and KSC Dry Run activities. Required communications support systems within these areas will need to be installed and tested prior to this date.

After the completion of any exercise or drills, the communications systems will remain in an operational status and be maintained by a RSL technical and engineering staff. The crew will remain on-site to perform critical operational checks on the systems to ensure performance and operations for the actual launch windows. The crew will also be on-site for pre-launch system security and will become the advance logistic personnel if another real world requirement for the RSL communications systems is needed.

Initial tear-down of the major systems will commence after release by the KSC RADCC Director. All communication systems and equipment will then be repacked, palletized, and loaded for shipment back to their origin. If the launch is successful within the first launch window, transportation of the equipment is scheduled to depart for the return trip on the fifth day after launch (N + 5 days). If there is a delay of the launch, the communications contingency plan would be dependent on the length of the delay. If the launch delay is projected to be more than 10 working days, the establishment of a maintenance cycle with reduced staffing will be instituted. This maintenance cycle would continue until approximately one week prior to the rescheduled launch date.

**MONITORING OPERATIONS**

In the event of anomaly, plans have been developed to deploy 10 monitoring teams off-site KSC and at least 8 monitoring teams on-site KSC. The off-site and on-site teams will be armed with 4-inch high-volume air samplers, Violinist, Alpha survey meters, portable generators, and environmental sample collection tools, as required.

Thirty locations have been identified for continuous air monitoring by Environmental Continuous Air Monitors (ECAMs). These ECAMs will automatically transmit the sampling data to the data center.



## **FRMAC Web**

The FRMAC Web is an Internet-based data dissemination application used to assist local, state, and federal decision makers during a radiological incident. This secure web-based information system provides a convenient method of sharing consequence management information, such as event status data, plume model predictions, measurement data, and other data essential for decision makers.

The NNSA currently maintains the resource and has facilitated near real-time data sharing between FRMAC federal agencies, and state and local organizations. National Atmospheric Release Advisory Center (NARAC) and FRMAC have established these Web sites for sharing information with multiple agencies. The effort has also laid the foundation for rapidly developing sharing and automated distribution tools for a wide variety of customers. Authorization to the information on the web is controlled by the Lead Federal Agency through the FRMAC Director via the RSL FRMAC Web Administrator. Requests to access the FRMAC Web are processed through the RSL FRMAC Web Administrator.

## **Data Assessment**

Goals of the ALSG in assessing offsite data are to identify areas in which there is a potential for early health effects; highlight and notify the Assessment Manager of any unexpected findings; maintain awareness of monitoring and laboratory work underway; maintain awareness of Action Requests and their progress; review all incoming data and not get confused by redistribution of copies; correlate incoming data with Monitoring Plan and Action Requests, expediting high priority items; and correlate incoming sample data with Monitoring Plan and Action Requests, expediting high priority items.

Actions and objectives of the management information system employed by ALSG are to assist the Assessment Manager with assignment of priority and detection limits to samples submitted for analysis; develop a characterization of the radiological scenario; summarize key aspects for presentation to decision makers; produce GIS maps with data; produce the Protective Action Guideline (PAG) Zone Map set at least once per shift; use NARAC/Sandia Hazard Response Capability (SHARC) for early PAG Zone Maps; assure Monitoring and Sampling Status Map is produced at least twice per shift; obtain Posting and Location Identifier maps at least twice per shift; prepare maps that integrate several data types on one base for comparison; direct application of conversion factors to data sets; Ensure Quality Assurance (QA)/Quality Control (QC) working closely with GIS and Data Center; perform quality reviews of data; pursue and resolve quality issues; assign Assessment quality "flag"; prepare QA Cover Sheet for all products; approve and release as many Assessment products as possible; maintain QA records of Assessment division activity; and maintain assessment library.

The three primary presentation formats of data products are:

Interactive mapping: The quickest method for retrieving data needed for an assessment is through interactive mapping. This type of information can generally be derived directly from the GIS by sitting down at a terminal and querying data interactively on the system. The requestor gets the necessary information, and no other products are required. This is an effective tool used by Assessment scientists to review data and check the validity of both measurement and spatial information associated with new data points.

Computer displays projected to large screens: Often, ALSG scientists need to view data for group discussion that might lead to generation of protective action recommendations or just to understand the general status of the response. To meet this requirement, GIS screen displays can be projected to large format to guide the group discussion. This is a quick method to disseminate information without time lags associated with hardcopy printing.

Hard copy maps and tabular summaries: Hard copy maps are often necessary for analysis of radiological data conditions, providing radiological status to the lead federal agency (LFA) or other ALSG organizations, or for dissemination at press briefings, etc. Hard copy products also represent a snapshot in time, indicating conditions at the time of printing only, and can be easily referenced based on map numbering information.

The Current Radiological Conditions Maps is a best estimate of the present dose rate. It is used primarily as a Health and Safety aid to guide/plan field operations. This map is *not* used to convey PAG comparison. If the resuspension dose is negligible, then this is just external exposure rate. However, if resuspension dominates the external dose, then this map is the deposition multiplied by the appropriate dose conversion factor. The process for production of these maps is determine if dose is external or inhalation; if external exposure dominates, obtain all exposure rate data available including AMS; import into GIS as separate coverage areas; if inhalation dose dominates, obtain all marker nuclide data available including AMS; import into GIS as separate coverage areas; have GIS set legend break points at the desired values. Use different colors for each with the highest as red and the lowest as blue. (The defaults are: 10 mrem/h, 2.5 mrem/h, 1 mrem/h, 0.5 mrem/h and 0.05mrem/h); plot that comparison as a single coverage; inspect the plot and draw on it the best estimate for the selected contour levels; have GIS digitize the hand drawn map as the current condition coverage; present this coverage as the Current Radiological Conditions Map; and include a text box to explain the nature of the map.

The PAG Zone Map indicates zones in which particular PAGs are exceeded. Two versions (Near Field and Far Field) are required, because some PAGs will only be exceeded very near the incident cite (<10 miles), while other may be exceeded to great distances (>50 miles). The maps may show any combination of these six zones: Evacuation (Early Phase), Sheltering (Early Phase), Relocation (1st yr), Long Term Objective (2nd yr), Long Term Objective (50 yr), and Ingestion (food embargo).

The Monitoring/Sampling Status Map summarizes the location and type of all monitoring and sampling data that has been collected up to the current time. Their purpose is two-fold: (1) portray the progress of the monitoring effort and 2) convey some concept of quality and confidence for the PAG Zone Map. Previous data ("Assessed" flag set) are plotted first in a muted color. Current data being reviewed ("Verified" flag set, but Assessment's flag not yet set) are plotted last in a bold color. Thus, new data overwrites old data. The maps continually grow in density and diversity of data collected. They do not reflect the level of radiation, concentration, or dose. Unique colors or symbols are used for each measurement and sample type.

## **SAFETY**

### **Overview of Operation**

Through the National Aeronautics and Space Administration Headquarters (NNSA/HQ), RSL ALSG personnel will participate in the MSL launch activities. Environmental, safety, and health procedures, which will be followed, are derived from regulations contained in:

- 29 CFR 1910, Occupational Safety and Health Standards
- 40 CFR 1500-1517, National Environmental Policy Act
- 49 CFR 382-399, Federal Motor Carrier Safety Regulations
- 10 CFR Part 835, Occupational Radiation Protection

### **Impact on Public Safety and Health**

There are no foreseen significant impacts to public safety and health as a result of this deployment activity. Activities that will be conducted in the Cocoa Beach, Florida, area have been coordinated in advance and will be conducted with minimal interference to the general public. The public risk by the logistics movement is not greater than that generally encountered and accepted by similar and routine commercial conveyance.

### **Environmental Concerns**

There are not any known potential adverse environmental impacts associated with the plan to conduct this deployment activity. Any debris from this activity is considered industrial non-hazardous and will be disposed of as trash. It is unlikely that any impacts to soil, vegetation, or surface water will occur from the

activity; however, if it is suspected that any test residues, spills, or leaks from equipment used will reach the soil, vegetation, or any surface water, mitigation procedures will be included in the safety plan.

### **Additional Safety Requirements**

All employees associated with the support of this project are well experienced in the activities involved. Applicable employees have completed extensive training in support of the launch. A safety briefing for ALSG personnel will be conducted prior to departure. Safety topics will emphasize motor vehicle safety, importance of back safety when loading and unloading equipment, adhering to correct procedures governing the work, appropriate use of personal protective equipment based on job-specific safety requirements, and each individual's personal responsibility for safety. In addition, off-shift safety will be addressed. Everyone present will monitor safety, and all participants are responsible to suspend operations (Stop Work), if appropriate, to correct unsafe conditions or acts. RSL employees will be current in the Loading Dock Operations work package.

### **DEPLOYMENT/REDEPLOYMENT**

The RSL advance support personnel (six Communications Specialists and one Mechanical/Electrical specialist) will deploy to Cocoa, Florida via commercial air on July 27, 2009 to unload the equipment and setup communications at the various launch support venues. On August 31, the advance ALSG mission support personnel (six communications and two air sampler/radiation detector technicians) will deploy to Cocoa, Florida. On September 2, the main party for the ALSG will deploy to Cocoa, Florida. The ALSG personnel will redeploy to Las Vegas via commercial air two days following the launch. Communications, Operations, and Mechanical/Electrical personnel will not redeploy until four days following the launch due to communications equipment teardown, pallet building, and truck loading.

### **HURRICANE CONTINGENCY AND RECOVERY PLAN**

#### **Hurricane Contingency Plan**

Employees will be housed at accommodations on the mainland in order to allow for easy deployment in the event of a hurricane. In this situation, employees will relocate, under coordination of the RSL logistics coordinator, to accommodations on the mainland outside the path of the storm. In conjunction with NASA, an assessment will be performed on any actions required at the ALSG due to the hurricane, and the RSL logistics coordinator will provide specific and precise direction to RSL employees required for these actions. For example, satellite equipment at both the Armory and RADCC will be dismantled and secured inside. Antennae will be secured if time and safety allows.

#### **Recovery Plan**

The RSL logistics coordinator will provide guidance to the team when to return to NASA to restart operations to support launch.

### **CONCLUSIONS/ SUMMARY**

Work activities associated with an unlikely anomaly during the launch of the MSL will be supported by RSL. These activities include data acquisition and assessment, support of communications systems, and support both the NNSA and NASA as required to quickly assess any change in the radiological environment. Tools recently developed and/or procured for the NNSA, such as FRMAC Web and ECAMs, will be employed.

**DEFINITIONS**

ALSG	Advance Launch Support Group
AMS	Aerial Measurement System
BCEOC	Brevard County Emergency Operations Center
CDMA	Code Division Multiple Access
CMRT	Consequence Management Response Team
DOE	U.S. Department of Energy
ECN	Emergency Communications Network
EOC	Emergency Operations Center
FL EOC	Florida Emergency Operations Center
FRMAC	Federal Radiological Monitoring and Assessment Center
GIS	Geographical Imaging System
GPRS	General Packet Radio Service
IP	Internet Protocol
ISP	Internet Service Provider
JIC	Joint Information Center
KSC	Kennedy Space Center
LAN	Local Area Network
MCU	Multi Conferencing Unit
MECN	Mobile Emergency Communications Network
MPCD	Multipath Communication Device
NARAC	National Atmospheric Release Advisory Capability
NASA	National Aeronautics and Space Administration
NNSA	U.S. Department of Energy, National Nuclear Security Administration
NNSA/NSO	U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office
NOC	National Operations Center
NSTec	National Security Technologies, LLC
O&C	Operations and Checkout
PAG	Protective Action Guideline
PON	Pay load Operation Network
RADCC	Radiological Control Center
RF	Radio Frequency
ROCC	Cape Canaveral Range Operation Control Center
RSL	Remote Sensing Laboratory, Las Vegas, Nevada
RTG	Radioisotope Thermoelectric Generator
SHARC	Sandia Hazard Response Capability
VHF	Very-High-Frequency

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