

# Spectral Operations Resource Center

## Spectral Imaging from Kuwait

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“**W**e’re going where...to do what?” Was my initial response to Mr Bo Dunaway’s (Chief, SMDC-Colorado Springs, Remote Sensing Branch) phone call forewarning MAJ Tim Haynie and I of our impending deployment to Baghdad to support the Office of Reconstruction and Humanitarian Assistance (ORHA). I can honestly admit my skepticism was at an all-time high. We had just spent three months attached to Combined Forced Special Component Command (CFSOCC) in Qatar, exploiting commercial spectral imagery to assist in the targeting and destruction of Iraq’s military infrastructure and now Bo wanted us to use the same tools to “Reconstruct and Assist” ... right. After several hooahs (which I’ve come to learn mean anything but NO) were exchanged, MAJ Haynie and I began the task of preparing the SPEC-Tr team for success. LTC Elizabeth Kuh (ORHA Space Operations Officer) was a huge help in the initial planning stages of getting the Spectral Exploitation Cell-Transportable (SPEC-Tr) on the road to Baghdad. She was on site and knew the mission requirements and logistic support constraints we could expect upon arrival. She wanted the team to be light, non intrusive and able to provide high impact spectral and commercial imagery support...oh, and be there by Friday.

Having the best trained and most experienced team of “Spectral Renegades” on the planet, sitting right next to me, made planning simplistic. MAJ Haynie would run operations and provide top cover, SGT Brandi Harris would be the topographic and commercial imagery production specialist, SPC Brian Marsh would get the spectral exploitation systems installed and keep them running, and I would provide spectral/MASINT expertise as needed. Since we would have to deploy without support from the Eagle Vision 1 commercial imagery downlink, we would need to rely on reachback support to the Spectral Operations Resource

Center providing new commercial imagery and fall back support on any large or analysis-intensive projects that require their “heavy lifting” capabilities. The one piece of equipment that enabled us to make this idea a reality, was the Space Support Element Toolset-Light (SSET-L), providing us the capability to move huge spectral data files and products to/from the SORC and forward deployed ARSSTs in minutes.

Once on the ground in Baghdad, we were fortunate to be collocated with ARSST 13. They had been on the ground for almost a month, knew the standard operating procedures, and were already supplying ORHA with a myriad of Space support products and topographic and commercial imagery support requirements. This was my first experience working with an ARSST and I have to say these guys were truly impressive to watch, never turning a request away and dead-set on producing each and every product to standard. Honestly, there was not an office in the ORHA palace that didn’t have an ARSST 13 product on the wall. The SPEC-Tr team fit seamlessly into their already well-functioning operation. We began taking on the commercial/spectral imagery requests, providing image maps and pushing requests for imagery support to the SORC. It became apparent early on that there was a niche for high-resolution commercial imagery, providing ORHA ministries with “eyes-on” planning capabilities without having to leave the palace. Security teams could plan routes for transporting high level personnel or money deliveries without ever having to expose themselves to possible dangers. High-resolution imagery played an important roll in the early planning stages of reconstruction and the time had come to prove how spectral science could help answer the mail.

The marshlands of southern Iraq had once been one of the largest pristine marshlands on the planet, an unspoiled habitat for thousands of unique animals



SORC Imagery was used to detect soil disturbances that led to the discovery of mass graves. Top left, skeletal remains of a Shiite are resurrected at a mass grave site near the town of Hillah; below, a chilling look at the multitudes of bodies that were unearthed. Photos by MAJ Tim Haynie



and a source of livelihood for the surrounding Shia population. During the 1980s, the Iraqi regime devised a plan to control, with the intent to displace, the Shia populace in southern Iraq. To accomplish this, Saddam Hussein ordered the marshes be drained, idea being if the Shia's livelihood was removed they would in turn leave. The marshes were drained, but the Shia remained in place, the only outcome of the operation being the destruction a delicate ecosystem. The ORHA Ministry of Interior requested a spectral study of the areas to determine how much damage had been done. SGT Harris requested archival spectral imagery over the area from the SORC to coincide with the dates before and after the draining operations. The Landsat Thematic Mapper imagery over the entirety of southern Iraq was mosaiced together, spectrally normalized, and change detection algorithms were applied. The resulting product was passed on to the Ministry and was considered an invaluable asset for future plans to restore the marshlands to their previous state. This would not be the last time spectral analysis would help the Iraqi people overcome the damage of the former regime.

The most chilling discovery since the fall of the former Iraqi regime is the evidence found throughout the countryside of mass graves. These testaments of the cruelty and brutality of Saddam Hussein's government are being discovered almost daily, some supposedly containing political prisoners, some military prisoners of war from Kuwait and Iran and some containing men, women and children from the Shia and Kurdish cleansing of the late 1980s and early 1990s. The International Forensic Centre of Excellence for the Investigation of Genocide (INFORCE), appointed by ORHA to investigate several known mass graves, approached us for assistance in locating and identifying mass grave locations throughout the country. Through several site

surveys of the mass grave sites and hours of in-depth spectral analysis, it was determined that there was nothing we could do to detect, identify or locate mass graves. It was discovered, however, through our analysis, that we could detect soil disturbances related to the initial digging in the area of the mass graves. There is a high abundance of gypsum throughout Iraq and, using the known spectral characteristics of this mineral, we can show to a high degree of certainty that there has been a disturbance of the soils in and around an area. Using unclassified commercial spectral imagery over the area from the same time frame as the incident and comparing the analysis results to the same area before the incident — we can pinpoint the time frame that the known locations was installed. This information can be used as evidence in a war crimes tribunal to prove dates and locations of possible genocidal crimes.

The spectral and commercial imagery support to ORHA is ongoing, with SORC liaisons forward deployed to Baghdad and with future deployments of spectral analysts and geologists to support the mass grave surveys. There is no way I could have ever imagined I would have been an integral part of this history-making event, and I would, given the chance, volunteer in a second to go back...this time though, I'll know what to do ... and where I'm going.