

SUBJECT: Trip Report for the Portable Laser Coating Removal (System) PLCRS Project

1. **PURPOSE:** Visit and develop partnership with the Royal Air Force (RAF) to share information on laser stripping. Visit and discuss details and contracting actions for the laser project with the three laser manufacturers

2. **TRAVELERS:** Debora Meredith, HQ AFMC/LGP-EV
Gerard Mongelli, HQ AFMC/LGP-EV (SAIC)
Tom Naguy, AFRL/MLQL

3. **ITINERARY:**

20 - 22 Jun 01	RAF/DERA - England
26 - 27 Jun 01	Laserline - Koblenz, Germany
28 - 29 Jun 01	Selective Laser Coating Removal (SLCR) - Kolon, Germany
2 Jul 01	Quantel - Paris, France

4. **ATTENDEES:** See attachment.

5. **DISCUSSION:** The purpose of this trip was two fold, the first was to develop a partnership with the Royal Air Force in order to crossfeed and share information between our two countries on the laser project as well as other aircraft sustainment initiatives. The second purpose was to meet with the three laser manufacturers to further discuss their products, to ensure the contractors understand the requirements of this project and to discuss how they plan to meet the requirements. All three companies are currently under contract for phase I to optimize and enhance their units before shipping. In phase II, we plan to lease the units and perform lab testing and program design reviews. In phase III, we will purchase the final enhanced unit and perform field testing at various DoD locations. In the final phase, we plan to develop the procurement package. The intent of this project is to demonstrate that a portable, hand-held laser can efficiently and safely strip coating systems from various weapon system components.

a. RAF/Defense Research and Evaluation Agency (DERA), England: The Royal Air Force through the Defense Research and Evaluation Agency (DERA) and the Defense Logistics Organization has been testing a portable, hand-held ND: YAG laser system for the past year. We met with the lead engineers and briefed our project. The RAF personnel then discussed their project and the results they have achieved. We had an opportunity to tour their facilities, to view the laser and examine test specimens. The RAF has been working with Quantel to design a hand-held laser system using the Laserblast 1000 system. This is the same unit we are planning on using for the dem/val. The RAF offered to lend us their Laserblast 1000 unit with the square beam technology to perform our testing. This would save us a tremendous amount of money since we would no longer have to lease the unit for our testing. The RAF also agreed to share their test data with us.

A. The RAF had quite a few concerns with the CO2 laser. RAF experienced a 60 percent degradation on composite substrates with a CO2 laser. RAF agreed to share a copy of their report on composite stripping with the CO2 laser. The

RAF also mentioned their concerns with substrate temperature on the leading edges.

- B. RAF has done some work on reverse stripping on composite surfaces with the ND: YAG laser without damaging the substrate.

We agreed to develop a formal international agreement to share information and work jointly on this laser project. The RAF would like to share our information on this project, especially our test results with the diode and CO₂ laser. In addition they are interested in sharing and crossfeeding information on other aircraft sustainment initiatives such as the Joint Group on Pollution Prevention's non-chrome primer project and lead free solder project. We also agreed to accept their Laserblast 1000 unit for an 18 month period. We would be responsible for shipping the unit to WPAFB. (Note: We plan to ship the unit through TMO out of Mildenhall)

- b. Laserline, Koblenz, Germany: Uses a diode laser system which consists of a compact diode beam source, a hand held system and control panel. Also fiber coupled diode lasers, and moveable supply unit.
 - A. Laserline has the least amount of experience working with aerospace systems. It was agreed that it would be beneficial for the contractor to visit one of our ALCs to get a better understanding of the existing depainting process. One of Laserline's engineers will meet us at WR-ALC to tour the process and participate in re-validating our strip rates.
 - B. After discussing the details of this project, it was clear that the contractor did not have a good understanding of our requirements. It was determined we needed to develop a development/design spec that would clearly identify our specific design and safety requirements.
 - C. Laserline will require the most design and optimization of the three companies. We plan to perform a final design review of the prototype unit in Oct before the unit is shipped to WPAFB. Laserline agreed to provide us design drawings before the unit is manufactured.
 - D. Laserline would like to have an example of a complex geometry component to perform testing on. We agreed to see if we could find a component to ship for their use.
 - E. Since the Laserline system requires optimization, additional strip rate testing will be required. Laserline requested additional panels to perform additional optimization. We agreed to ship additional panels for optimization testing.
- c. Selective Laser Coating Removal (SLCR), Duren, Germany: Uses Transversely Excited at Atoms pressure –CO₂ laser (TEA-CO₂). Their laser system is being used in commercial aerospace industry along with automotive, gas and electric industries in Europe. Presently SLCR is building a CO₂ system for Corpus Christi Army Depot (CCAD) for use on helicopter blades. They also have a laser being tested at AF Plant 4 to strip coatings from missiles. Test results have been very good.
 - A. We had the opportunity to observe their modified hand held unit strip two panels with different coating systems.

- B. SLCR also discussed potential design enhancements to the unit. It was agreed that a development/design spec would be very beneficial to them. We agreed to send them a preliminary development/design spec and discussed the stakeholders' program design review meeting that will be held in Feb 02. Additional requirements will be identified during this meeting.
- C. SLCR had numerous questions regarding the schedule and work to be accomplished during each phase, therefore we discussed in detail the requirements of the statement of work.
- D. SLCR also requested additional panels to perform optimization tests.
- E. SLCR stated they needed to have the critical design review no later than Jun 02 to ensure all requirements would be incorporated into the final design and delivered to the Air Force on schedule.
- F. SLCR plans to ship their unit to WPAFB at the end of Oct. We will need to perform a final strip rate validation and requirements review before shipping the unit.

d. Quantel, Paris, France: Uses a ND: YAG laser system. They have been working with the RAF for the past year to improve the design and optimize strip rates. We liked many of the features that have already been incorporated into the system.

- A. Since we no longer need to lease a unit from Quantel, we discussed the change to the contract and their requirement to support design and optimization improvements to the system.
- B. We had the opportunity to strip a couple panels using the Laserblast 500 and 1000 units. It was obvious Quantel had additional optimization work to be completed.
- C. While touring their facilities and products, we noticed that Quantel had a glovebox system. We have just recently started a new AF project to develop and design a laser glovebox system and evaluate the possibility to strip specialty coatings. We plan to purchase the glovebox from Quantel for this new project using the existing contract.
- D. No additional trips to Quantel will be required at this time.

ATTENDEES:

Selective Laser Coating Removal (SLCR)

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Ralf Kaufmann
Udo Freyaldenhoven

LaserLine

Christoph Ullman
Michael Nagel
Mark Daichendt

Quantel

Alain Diard
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