

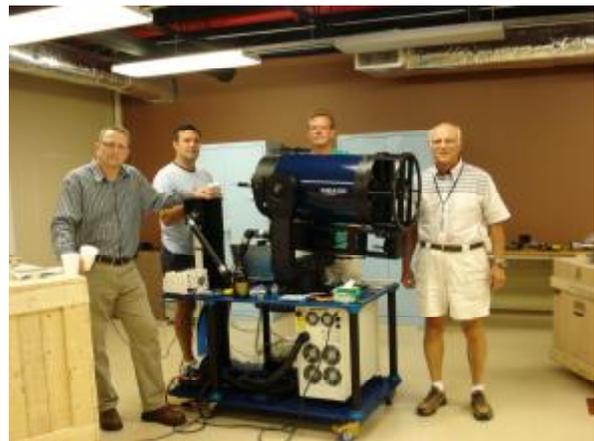
**DTI Grant for Research & Development**  
**Project Stand-Off LIBS/Raman - Final Progress Report**  
Period 1 April 2006 – 31 March 2007

## 1. Summary

We are very pleased with the progress and the end result of this R&D project. No major problems were encountered during the course of the work and our project plan was followed more or less as anticipated. Some delays were experienced in obtaining samples of explosives, primarily due to the difficulty in identifying a supplier who was prepared to sell small quantities (ie. less than 100 grams). In comparison, the acquisition of the necessary permits to purchase, store and use these materials was relatively straightforward once security clearance from the Police had been obtained. The final design experimental prototype was completed during March 2007 and is shown below (right image) during a technical demonstration conducted in June 2007 in Florida, USA.



1<sup>st</sup> prototype being tested during Sept 2006



Experimental prototype being demonstrated in Florida

## 2. Performance of the Stand-Off LIBS/Raman technology demonstrator

The ST-LIBS/Raman experimental prototype is designed to operate at various laser wavelengths (1064 nm, 532 nm, 632 nm and 355 nm) and was used to generate data (LIBS emission spectra and Raman scattering spectra) from various surface residues and bulk materials of interest to this project. For practical reasons, most experiments were conducted at short range (< 20 metres) although we did conduct one test at a range of 100 metres. The experimental system performed as expected and has enabled us to obtain valuable data which we are continuing to work with in order to demonstrate the feasibility of stand-off detection of selected “threat” materials.

### 3. Commercial exploitation plan for the next 6-12 months

This project has been instrumental in increasing the profile of Applied Photonics Ltd in this important area of technology development and has already helped us win business from the USA. I am delighted to report that, with our US partner company (Ameasol), we were awarded a US \$970k contract from US Army Research Laboratory in April 2007 to design and manufacture a ruggedised, field-deployable Stand-Off LIBS system. This contract has a planned duration of 10 months, culminating in a technical demonstration of the system at a proving ground in the USA (possibly Yuma Proving Ground, Arizona). The contract has helped to protect the employment of existing staff at Applied Photonics Ltd and has created two new full-time positions (a LIBS research scientist and a mechanical design engineer). Furthermore, we have been invited to participate in a number of other projects to be funded by US DoD / US DoHS, two of which are anticipated to commence this summer. Should these two projects commence as planned, we will need to take on additional staff and invest in new equipment.

The following financial summary illustrates the major impact this project will have on the company's revenue, infrastructure and human resources:

Turnover for year ending Jan 2007:	£242k
Projected turnover for year ending Jan 2008:	£600k
Investment in new equipment / infrastructure for year ending Jan 2007:	£25k
Projected investment in new equipment / infrastructure for year ending Jan 2008:	£100k
Staff numbers at year ending Jan 2007:	4
Staff numbers at June 2007:	6
Projected staff numbers at year ending Jan 2008:	8

We continue to receive considerable interest in Stand-Off LIBS/Raman from various organisations within the USA. Although the technology is not yet fully developed, considerable interest exists from organisations interested in purchasing experimental prototypes. We aim to commercially exploit any opportunities that arise from this and, subject to gaining additional funding (we have submitted a proposal to MoD), we plan to continue our own development programme which we hope will allow us to remain at the forefront of this area of technology.

Dr Andrew I. Whitehouse  
For and on behalf of Applied Photonics Ltd

21 June 2007