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| | | Contract | 22935/09/NL/PA | | |
| | | Title | **Project Summary** | | |

# 1. Introduction

This document summarize the study performed for this contract, aimed at qualifying an optical fiber connector set for space application. The statement of work requested three phases: phase I for market and connector study with first elaboration of Evaluation Test Program (ETP), phase 2 for evaluation applying the ETP, phase 3 for definition of the Qualification Test Program (QTP) based on the results of the ETP, the production and qualification of connector sets.

# 2. Summary Phase I study

The phase I served as a general study on cable and fiber, as well as market. During this phase, the final components to be submitted to the evaluation were defined and a PM1550nm fiber was chosen with a PEEK loose tube mounted on either AVIM and Mini-AVIM was chosen.
An ETP plan was defined and a new draft of the AVIM detail specification submitted.

**fig. 1 AVIM (left) and Mini-AVIM (right)**

# 3. Summary Phase II evaluation

Assemblies were produced with a frozen PID and the components submitted to the ETP. Detail results report was produced, discussed and published at ICSO2012. These results layed down the base for the qualification. Environmental range was defined for qualification and a QTP prepared.
Diamond was audited by ESTEC and responded to the ESCC audit report by correcting the only 3 findings found by the auditors.
During this period, Diamond started the implementation of a new “space grade” process internal to the company that should be closed by the end of this project.

# 4. Summary Phase III qualification

The QTP prepared in the previous phase was used and complete assemblies (patchcords) were added to the tests as a supplement.

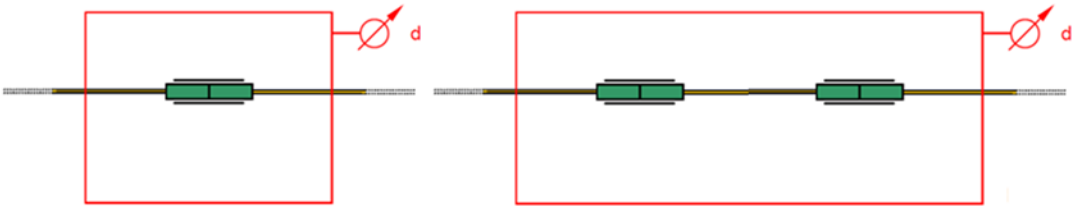


**fig. 2 Connector set (left) and Patchcord (right) test setup**

This phase was troubled by Qualification lot production problems. Results obtained during the evaluation on the AVIM were not reproducible and root cause was only found after numerous attempts and not where the problem was expected.
These problems were related to the wrong epoxy used during evaluation allowing higher performance during the evaluation on the AVIM only. As the qualification lot and Mini-AVIM evaluation lot were all produced with the declared epoxy, it was decided to bring the AVIM temperature range at the same level of the Mini-AVIM with the declared epoxy at -55°C to +85°C.
Both connector sets passed the qualification and results presented to ESTEC during final review. The complete assemblies passed as well and this lay the foundation to qualify Patchcords which were not covered originally by the project.

New set of draft standards were submitted for the detail specification of the AVIM and Mini-AVIM, as well as for the Generic specification handling qualification and modification submitted for the existing Basic specification.

# 5. Conclusion

The project was supported by ECI program, 22935-09-NL-PA. Beyond the original goal of creating documents to qualify connector set, this project allowed Diamond, already well versed in optical connectors qualification, to reach better knowledge of its products allowing better support of the space community concerning these products and application.
The generic and both detail specification will be submitted to ESCC for the QPL insertion and Diamond will request EPPL insertion for assemblies and as a provider of solution for this technology.