ASTRIUM SATELLITE MULTISITE APPLICATION OF MATERIAL TECHNOLOGICAL BOARD: COMMISSION FOR TECHNOLOGIES AND MATERIALS (CTM)

11TH INTERNATIONAL SYMPOSIUM ON MATERIALS IN SPACE ENVIRONMENT

Christian PUIG(1), Ian McNAIR(1)

(1) EADS ASTRIUM, 31, av. des Cosmonautes 31402 TOULOUSE Cedex 4, France,

Phone : 00 33 (0)5 62 19 53 38 E-mail: Christian.puig@astrium.eads.net

ABSTRACT

The idea of a CTM (Commission for Technologies and Materials) came up in early 2004 when German, English, and French Astrium satellite Materials & Processes representatives necessarily turned "multinational minded" due to new big contracts awards implying all sites.

A multinational organisation was already in place since former Matra Marconi Space company, and a final one when DASA joined the EADS Astrium adventure. At M&P level, contacts and exchanges took place very quickly between all sites but people were still mainly involved in their own programs, with local processes and history. The need for a global M&P network dedicated to day-to-day work appeared with obvious need for multisite generic qualifications and M&P alerts management process. The idea of an MTB (Materials & Technological Board) finally came to the front scene in 10th ISMSE located in Collioure in 2006 with the opening session of Mr J.Bosma. CNES and ESA then agreed to develop the idea of a European MTB and Astrium Satellites proposed the CTM experience as a main contributor.

1. INTRODUCTION

Up to now, 31 CTMs have been held, starting from a few people (D, Uk, F), and reaching now more than 10 representatives with Astrium subsidiaries attendance (CASA, Tesat), Direct Materials Supply involvement, AIT harmonization processes initiatives and extension to Astrium ST. Meeting frequency is around 7 per year, with a 1 or 2 days work, alternance of videoconferences and mandatory face to face meetings. All sites could be visited, with special “tours” – mainly material labs and manufacturing facilities – which allows each responsible to be “M&P open-minded”, knowing all sites skills and facilities.

When necessary, for instance major M&P issues and alerts, an extra CTM is set up. Most of ideas that constitutes now the Astrium CTM started end of 2003 and in the early 2004, pushed by ambitious multisite programmes and occurrence of major alerts such as risk of tin whisker growth.

Fig. 1. A tin whisker short-circuiting two opposite polarities of a relay, leading to Warning Notice n°100 and specific Astrium “Risk mitigation” document.
2. OBJECTIVES OF CTM

Major objective of CTM is to have common view and treatment of M&P Alerts management: impact research, way to proceed, corrective and preventive actions than can be general or dedicated to programs. Others topics are also linked or addressed, either in CTM or during dedicated splinter meetings: Sharing of labs means, Exchange of skills, Harmonized view on qualification processes, Common voices at symposiums or ECSS attendance, Unique comprehension of ITAR or REACH issues, Grouped investments on M&P Tools (Granta, ESA DMPL).

2.1. Reinforce Astrium M&P network

Astrium CTM covers all Astrium sites as shown in Fig. 2. This allows regular, exhaustive and rapid exchanges within Astrium M&P community. Knowing each M&P actors, labs facilities and people skills allows an efficient treatment of M&P alerts for the benefit of projects and futures R&D activities.

2.2. Treat M&P alerts

CTM considers a material or a process needs alert management and handles the CTM instances if :

- The Materials is (resp. the Process is involved) in a flight part And
- The Material & Process issue is considered as possibly generic (lot, product or manufacturer related), Or The Material & Process issue is involved in several different programs.

“Black anodising onto aluminium alloys” alert, as shown in Fig.3, is an example of major M&P issue recently handled by CTM.

Fig.3. “Black anodising onto aluminium alloys” alert

At project level, Astrium M&P representatives ensure traceability, technical understanding of the root cause, resolution and demonstration of new qualification status to customer.

At multiproject level, and in case of multiproject impact or generic issue for a flight application, CTM handles the M&P item and ensures communication to all programmes through adequate technical note for already mounted, procured parts, stock items and future procurements.

2.3. Manage new issues (i.e. REACh)

It is not in CTM mission to handle sustainability or obsolescence issues. Nevertheless, new items were recently put to the front scene and justifies new missions or orientations of CTM in the future:

- Changes in 3 glues chemical formula (epoxies) which constitutes new topics related to REACh future issues. New or delta qualification of modified adhesives or substitutes are requested to assess qualifications on most commonly used substrates.

- Evidence of fraudulent certificates of conformities (CoCs) coming up beginning of 2009 for titanium procured from a US supplier.
2.4. Promote M&P databases and tools

When managing a M&P alert, a prerequisite is to have searchability and sortability in M&P masterfiles, with full respect of ECSS-Q-ST-70 classification greatly helping impact research.

However, those prerequisites happens not to be sufficient to allow a maximal efficiency for project reactivity.

Use of modern databases and tools is now a good way of improving the efficiency of an M&P impact research. 2 complementary tools are used by Astrium which have been linked together with an internal proprietary application:

- GRANTA MI tool is used as a repository of Material names, which constitutes the link between Material properties (Mechanical, Thermal, Electrical, and Optical) and the Declared Material List (DML). Specific application are currently being developed under GRANTA control and help on Thermo-optical properties and Electrical properties for ESD concerns.

- ESA DML / DPL tool, developed under Estec material group responsibility, is dedicated to Declared Materials & Processes Lists capture, for all Earth Observation, Science and Navigation programmes, and under construction for Telecoms ones. Material name is captured from GRANTA MI through dedicated index conversion table and allows rapid impact research in case of alert.

3. MTB WAY FORWARD

3.1. The obvious need for an MTB

The obvious need for an MTB (Materials Technology Board) can be recalled hereafter.

Major issues occurring on Materials & Processes in Space Environment affect all companies and agencies in Europe and moreover in the world. All these actors will take benefit of a common and consensual management of these issues, provided confidentiality can be respected.

This benefit is obvious at anomaly level on stock items and already mounted parts, and reinforced when programmes are made in cooperation between companies and / or agencies, should they be Telecom ones, Earth Observation, Sciences or Navigation.

For instance, managing the anomaly differently on a platform and an instrument built by different companies should be nonsense. Unfortunately, examples of these nature have already been observed and nothing has yet been put in place to prevent from such behaviours.

The benefit is also evident at procurement level. In that case, handling the M&P issue will be done on a unique
way, of course with the help of suppliers involved and not against them. This is linked to continuous improvement of purchase processes with the opportunity to have common Material Procurement and Acceptance Specification released.

Finally, at a second closure level i.e. the “process treatment” of the anomaly, if new or delta qualifications are needed, managing it at agency level with the help of the European space community will permit sharing of both fundings and results.

Speaking about Europe in this MTB overview does not of course exclude non European partners, and one can notice on various example the appreciated cooperation with JAXA, NASA, CSA, and many other partners, at any level.

In any case, building this MTB at European level should constitute a first step.

3.2. A WAY FORWARD

Besides the MTB, major actions have been undertaken at tools and database level in order to build a SMDB, Space Materials Data Base, with the help of CNES and ESA agencies, Astrium, and GRANTA MI company.

Building up SMDB is a first milestone to the MTB creation. It paves the way for an M&P unification of major European actors of space industry, which is not contradictory with confidentiality and competitive advantages of companies acting as competitors.

4. CONCLUSION

Astrium will continue and reinforce CTMs now implying Dutsch Space industry – Welcome to them - as a new subsidiary joining CASA and Tesat, and progressive integration of Astrium ST.

Reflection about REACh issues and more generally Sustainability issues has started. Case by case items have already been dealt with, and within the next two years, splinter CTMs will likely be handled on these “promising” topics.

By the end, pushing forward the new MTB is part of CTM objectives for end 2009 and 2010.

5. REFERENCES

1. ADS.E.1000 : Astrium management and treatment of alerts.