AIRBUS-DS EEE ALERTS SYSTEM AND INDUSTRIAL CONSTRAINTS

CTC (the international team !)

Alain Mouton (Airbus Defence & Space)
01-mar-16
ESCCON 2016
issue 3
1. Industry’s expectations from a EEE/PCB Alerts System

2. CTC objective & mission

3. CTC perimeter

4. CTC organization

5. CTC process

6. EEE/PCB WNs

7. CTC database

8. CTC metrics

9. Lessons learned and key questions when running an Alert System
1. Industry’s expectations from a EEE/PCB Alerts System

- The alerts shall give **simple and understandable information** for non specialists (synthetic technical analysis) and shall give all useful information for projects.

- The alerts shall **consider the industrial constraints (schedule and cost)**.
  
  *The Alerts System shall endorse responsibility at his level, not leaving projects deciding alone.*

- The alerts shall define a **clear and limited perimeter** (all efforts to be done to limit it as far as possible).
  
  *Perimeter may be defined in term of “product perimeter” and/or “using perimeter).*

- The alerts shall give **pragmatic (simple and understandable) recommendations**.
  
  *Projects want driving instructions from Alerts Committees => no open action such as : “contact the manufacturer”, “left to project decision”, …*

- The recommendations shall be explicit in the various cases :
  - Components mounted
  - Components in stock
  - Future procurement
2. CTC objectives & mission

**GENERAL**

CTC (Components Technical Committee) is the EEE/PCB Alerts Committee for Airbus-DS Space Systems.

**CTC OBJECTIVES**

1. to gather all potential generic internal events on EEE parts and PCBs.
2. to review available external alerts or advisories (ESA, CNES, GIDEP, NASA, manufacturers, …).
   in order to propose practical and concrete recommendations to Airbus-DS Space Systems.

**CTC MISSION**

- to provide quick information to Airbus-DS Space Systems projects (also ASL : Airbus Safran Launchers).
- to help in the control and processing of information related to the concern.
- to register the problems in a database for “technical memory” purpose
3. CTC perimeter

- **COMPANY PERIMETER**
  - Airbus-DS Space Systems and subsidiaries (e.g. ASL, Casa, Equatorial Systemas, Jena Optronik, Sodern, SSTL, Tesat)
  - CTC covers all Airbus-DS Space Systems plants in Brazil, France, Germany, Netherlands, Spain and UK.

- **PRODUCT PERIMETER**
  For internal problems, CTC handles the following instances:
  
  - the EEE part or the PCB is a flight part,
    
    and
    
  - the EEE part or PCB issue is considered as possibly generic (lot, product or manufacturer related, …),
    
    or
    
  - the EEE part or PCB issue may involve several different programs.

- **REMARK**
  - CTC only manages EEE parts and PCB issues.
  - Other domains (e.g. M&P, design, …) are covered at Airbus-DS Space Systems by other ad-hoc committees (CTM, DWN).
4. CTC organization (1/2)

- **CTC is based on a network of four local CTC-xx, using a similar process:**
  - membership (supply quality, prime project, equipment project, expertise)
  - meeting periodicity (first week of every month at fixed day)
  - working method
  - reporting (same format of MoM and mutual database)
4. CTC organization (2/2)

- **CTC MEMBERSHIP**

1. Each national CTC-xx is composed by four mandatory members:
   - EEE Supply Quality
   - EEE Prime projects
   - EEE Equipment projects
   - EEE Expertise & Failure Analysis

   Additional members attend as necessary, on CTC-xx leader’s request.

2. Each CTC-xx is chaired by a **CTC-xx leader**.

3. All CTC-xx leaders are composing the **CTC core team**.
   
   *This core team has meetings or phone conferences on specific occasions:
   - to decide, when necessary, which CTC-xx will handle a problem
   - to harmonize, when necessary, the technical position across all Airbus-DS Space Systems plants
   - to share information*

4. The overall CTC is managed by the **CTC chairman**.
5. CTC process (1/3)

- **CTC OVERALL PROCESS**

  1. Collection of information
  2. Review of information
  3. Reporting (MoM and company database)
  4. Issue of WN

1. **COLLECTION OF INFORMATION**

   - Any EEE part or PCB concern (external or internal) supposed to be in the CTC perimeter is communicated to one of the CTC-xx permanent members (available in every plant).
   
   - The CTC chairman monthly collects the information from the ESA, GIDEP and CNES alerts websites.

2. **REVIEW OF INFORMATION**

   CTC-xx meetings are monthly held (fixed day of first week of each month) in order to:

   - validate the provided information (internal or external),
   
   - decide to close the problem because it is minor or not relevant,
   
   - decide complementary investigations (root cause, perimeter, risk assessment, …),
   
   - prepare, review and approve WNs (giving perimeter & recommendations).

*Note: extra CTC meetings may be convened in case of emergency (not waiting for the monthly periodicity).*
5. CTC process (2/3)

3. REPORTING

CTC-xx MoM
- Each CTC-xx meeting is reported via MoM (Minutes of Meeting).
- A clear status (open or closed) is made for every topic.
- Preliminary information are given in case of WN to be issued.

CTC database (so called “histoctc”)
All topics handled by all CTC-xx are logged in a single database giving:
- the status of each item (open or closed)
- an hypertext link to all WNs
- an hypertext link to all MoM CTC-xx
- various metrics about CTC activities

CTC annual metrics
- Quantity of items handled and quantity of WNs issued
- Timings to issue WNs and close items
- Analysis of origin, root causes and recommendations (with statistics)

4. ISSUE OF WNs
See section 5 of this presentation.
5. CTC process (3/3)

- Reporting (monthly MoM)
- Database (histoctl)
- WNs (Warning Notices)
6. EEE/PCB WNs

- **PREPARATION OF EEE/PCB WNs**
  For EEE parts, only the CTC-xx can approve WN for issue.
  *note: they are formally distributed through the Airbus-DS Central Quality entity.*

- **FORMAT OF EEE/PCB WNs**
  WNs are always built in the same format:
  - Section 1 : Problem summary
  - Section 2 : Investigations and perimeter
  - Section 3 : Recommendations (mounted parts, stock, current & future procurement)
  - Annex : SpS Alert

- **RULES TO ISSUE EEE/PCB WNs**
  1. WN can be raised only when the perimeter and recommendations are clearly defined.
  2. WN must be approved by a CTC-xx leader before sending to Airbus-DS Central Quality for distribution.
  3. WN can be raised only 5 days min. after release of CTC-xx MoM informing about this WN.
    => a WN shall not be a surprise for a project!
  4. In case an Airbus-DS Space Systems Unit does not agree with a draft of WN or does not want to issue it as drafted and when this is not agreed by the CTC chairman, a WRC (WN Release Committee) is called with the following members: CTC chairman, relevant CTC-xx leader, each Unit quality representative and Central Quality representative.

- **CANCELLATION OF EEE/PCB WNs**
  CTC organizes an annual meeting (W51) reviewing all WNs to decide those to be cancelled due to recommendations or perimeter become obsolete.
7. CTC database (1/2)

- CTC has built a database, called "histoctc", permanently updated to summarize the items handled by CTC and to give their progress status.

- "histoctc" is an excel® spreadsheet accessible from any Airbus-DS Space Systems plant.

- "histoctc" gives the history of all CTC items since 1994 => >20 years technical memory!

- "histoctc" gives direct access to all WNs and CTC-xx MoMs.

- "histoctc" gives the reference with all external alerts (ESA, CNES, NASA, GIDEP, suppliers).

- The spreadsheet allows any kind of search or extraction per:
  - EEE part family,
  - EEE part type,
  - Manufacturer,
  - Root cause,
  - Date of occurrence,
  - WN reference, …
## 7. CTC database (2/2)

### CTC presentation

<table>
<thead>
<tr>
<th>TYPE</th>
<th>MFR</th>
<th>PROBLEM</th>
<th>EXTERNAL ALER</th>
<th>WN</th>
<th>WNI</th>
<th>da</th>
</tr>
</thead>
<tbody>
<tr>
<td>F067</td>
<td>09</td>
<td>TL26 relays</td>
<td>EA-261/EHE-9-A E</td>
<td>WN444-3</td>
<td>ASL42-3</td>
<td>W/15</td>
</tr>
<tr>
<td>U074</td>
<td>40</td>
<td>AMA DC/DC CV</td>
<td>FV5-A-14-01 E</td>
<td>WN443-1</td>
<td>ASL47-2</td>
<td>W/14</td>
</tr>
<tr>
<td>S051</td>
<td>08</td>
<td>TO-667/TO220AB pack</td>
<td>EA-261/EHE-7-A</td>
<td>WN442-2</td>
<td>ASL42-3</td>
<td>09/14</td>
</tr>
<tr>
<td>D035</td>
<td>08</td>
<td>TL271 transceiver</td>
<td>CR2P-1 M-121 R1</td>
<td>WN197-1</td>
<td>ASL3-3</td>
<td>05/14</td>
</tr>
<tr>
<td>G077</td>
<td>01</td>
<td>IN5822</td>
<td>N522-P-16-01 E</td>
<td>WN435-3</td>
<td>ASL43-3</td>
<td>09/13</td>
</tr>
<tr>
<td>P091</td>
<td>11</td>
<td>P ICs</td>
<td>EA-261/EHE-2-03 D</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>D047</td>
<td>01</td>
<td>SRAM AT5662-91</td>
<td>CR2P-1 M-121 R1</td>
<td>WN167-1</td>
<td>ASL3-3</td>
<td>11/13</td>
</tr>
<tr>
<td>F052</td>
<td>01</td>
<td>J147 relays</td>
<td>EA-261/EHE-2-03 D</td>
<td>WN450-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>G056</td>
<td>12</td>
<td>2N5666-9 A 2N5668</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>F058</td>
<td>12</td>
<td>transistors SMD40 pack</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>F068</td>
<td>40</td>
<td>CR70/CV (GUMS A/GUMS B)</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>G031</td>
<td>01</td>
<td>CWR banks</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>F366</td>
<td>01</td>
<td>TH1 capacitors</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>F377</td>
<td>12</td>
<td>2N5666-9 JAN</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>F209</td>
<td>0-8</td>
<td>TH2-yy-yz leathers</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>G071</td>
<td>01</td>
<td>ceramic chip capacitors</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>F565</td>
<td>01</td>
<td>MIV ceramic caps</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>F064</td>
<td>01</td>
<td>CR500 capacitors</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>U076</td>
<td>08</td>
<td>VGRB666 regulator</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>F593</td>
<td>08</td>
<td>IR3141xxx</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
<tr>
<td>F601</td>
<td>08</td>
<td>DCCM440, H+5</td>
<td>CR2P-1 M-121 R1</td>
<td>WN400-3</td>
<td>ASL8-3</td>
<td>11/13</td>
</tr>
</tbody>
</table>

### Direct access to MoM

- MoM -> ESCON 2016 - 01-mar-16
8. CTC metrics (1/4)

Several CTC metrics are directly accessible with “histoctc”:

- **M1** CTC activity per year since 1998 – updated once a year
- **M2** CTC timings per year since 1998 – updated once a year
- **M3** Pareto of EEE/PCB families *(all items since Jan-94)* – updated in real time
- **M4** Pareto of EEE/PCB manufacturers *(all items since Jan-94)* – updated in real time
- **M5** Origin of CTC items *(all items since Jan-03)* – updated in real time
- **M6** Root causes *(all EEE & PCB WNs since Jan-03)* – updated in real time
- **M7** Recoms for mounted parts *(all EEE & PCB WNs since Jan-03)* – updated in real time
- **M8** Quantity of EEE alerts by system *(GIDEP, ESA, CNES, Airbus-DS)* – updated once a year
- **M9** Quantity of cancelled EEE WNs per year *(vs quantity of new WNs)* – updated in real time
- **M10** EEE WNs backlog per year *(quantity of EEE & PCB valid WNs)* - updated in real time
8. CTC metrics (2/4) – CTC activities

M1a: CTC activities for EEE & PCB Issues
(limited to CTC-FR up to 2004)

- Review of NASA a/n
- CTC becomes international

Items handled by CTC
(PCB, Design & Mat included)

EEE WN/TN issued
(Design & Mat not included)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>36</td>
<td>32</td>
<td>29</td>
<td>30</td>
<td>34</td>
<td>35</td>
<td>51</td>
<td>74</td>
<td>89</td>
<td>59</td>
<td>51</td>
<td>70</td>
<td>47</td>
<td>50</td>
<td>65</td>
<td>38</td>
<td>43</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>
8. CTC metrics (3/4) – Distribution per EEE/PCB family (based on >900 CTC items)

M3: EEE & PCB FAMILIES HANDLED BY CTC SINCE Jan-94

- Percentage distribution of EEE parts families handled by CTC.
8. CTC metrics (4/4) – *Distribution per root cause (based on 170 WNs)*

M6: ROOT CAUSE OF WNs (linked to EEE & PCB) SINCE Jan-03

- Assembly: 68
- Fabrication: 39
- Screening: 22
- Design: 17
- General: 17
- Unknown: 4
- Radiation (unexpected): 2
- Using: 1

**Root Cause**

**Quantity**

[Bar chart showing distribution of root causes]
9. Lessons learned and key questions when running an Alert System (1/2)

- **Perimeter of the concept “alerts”?**
  - Should alerts be limited to technical anomalies (including counterfeit parts)?
  - Should other topics (e.g. obsolescence, PCNs and manufacturers’ errata sheets) be managed separately?
  - Always difficult to know, in advance, if the problem can be generic.
    … but avoid to transform an Alert Commission into a Technical Review Group.

- **Legal issues**
  - Can an alert be issued only by the user (without the manufacturer)?
  - How to involve the entity at the origin of the alert (e.g. EEE parts or PCB manufacturer)?

- **Quantity of alerts**
  - Pressure to raise many alerts (just to be covered).
  - Pressure to not issue alerts to avoid perturbation on projects.

- **Timing**
  - Balance between the necessity to quickly issues alerts (to warn projects) and the time needed for investigations to produce clear and pragmatic perimeter & recommendations.
    => alerts to be not too late but not too soon (without consistent information)!
9. Lessons learned and key questions when running an Alert System (2/2)

- **Alerts shall be based on technical facts**
  Perimeter & recommendations given in alert shall be **only based on technical facts**.

- **Pragmatism of alerts**
  No alert to be issued without a **well defined perimeter and clear recommendations**
  for mounted parts, stock and current/future procurement.

- **Alerts shall be realistic and industrially sound**
  The recommendations given in alerts shall be **industrially realistic and implementable**.

- **An alert shall not be a surprise !**
  Advanced information needs to be given before to raise an alert !

- **Management of alerts when issued**
  - Necessity to update alerts but only for major events.
  - Necessity to regularly review the alerts produced to cancel the old or obsolete ones.
  => necessity to **avoid the accumulation of alerts** to be managed by each project.