AIRBUS-DS EEE ALERTS SYSTEM AND INDUSTRIAL CONSTRAINTS

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CTC (the international team !)

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Content

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

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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).

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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.**

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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).

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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.

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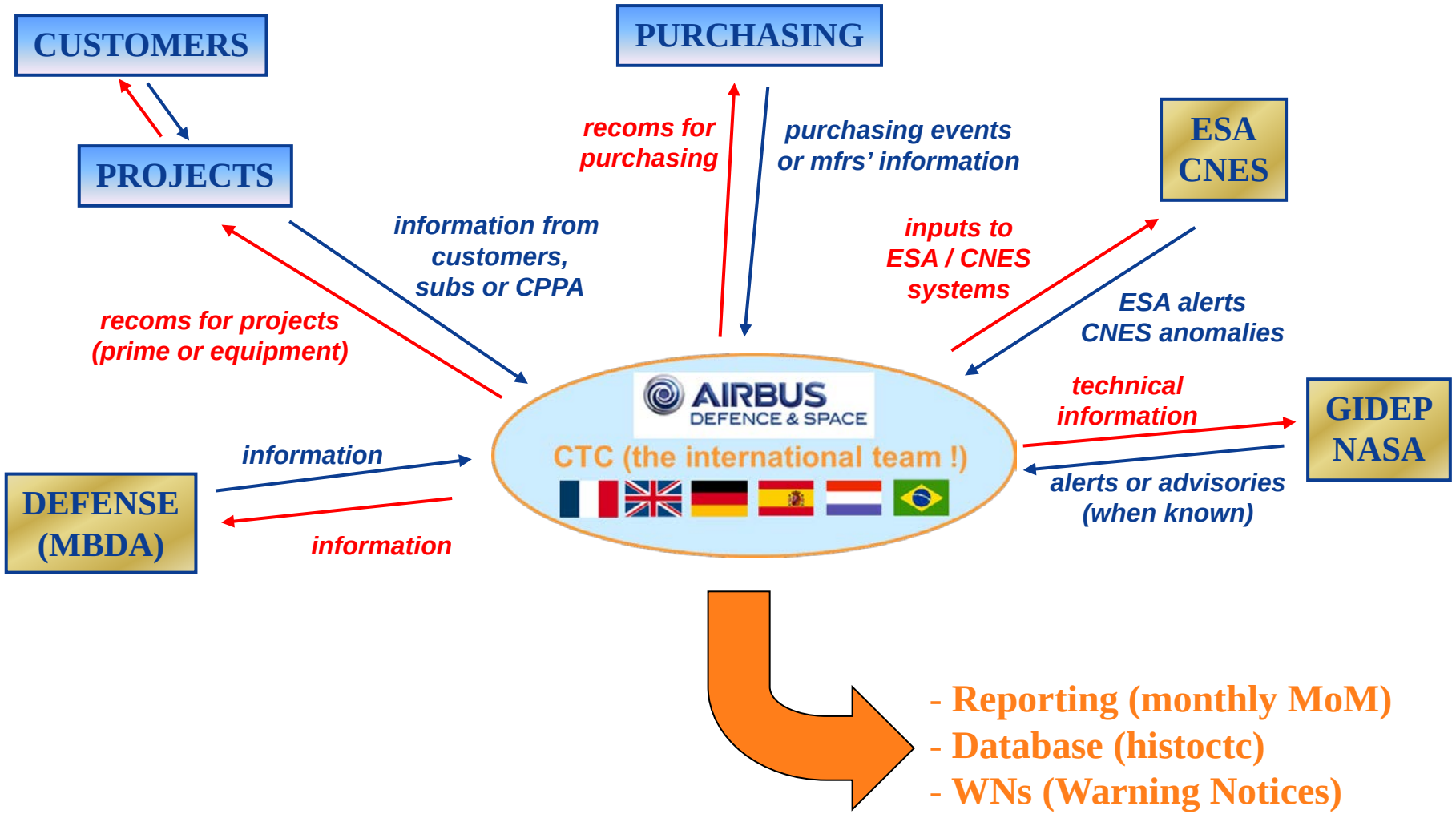
5. CTC process (3/3)



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.

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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)

direct access to WN

direct access to MoM

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CTC (the international team !)

CTC presentation

CTC procedure

CTC team

revised on : 28/01/16

MoM ->									
MoM-F	MoM-F	MoM-F	MoM-F		MoM-F	MoM-F	MoM-F	MoM-F
MoM-U	MoM-U	MoM-U	MoM-U	MoM-U	MoM-U	MoM-U	MoM-U	MoM-U
MoM-S		MoM-S	MoM-S		MoM-S	MoM-S	MoM-S	MoM-S
MoM-G	MoM-G	MoM-G	MoM-G	MoM-G	MoM-G	MoM-G	MoM-G	MoM-G

#		TYPE	MFR	PROBLEM		EXTERNAL ALER		WN	WNI	da	2015 04/	05/	06/	07/	08/	09/	10/	11/	12/
F603 S056	09	TL26 relays		coil wire broken	ESA	EA-2015-EEE-9-A	E	WN444-2	ASL130-2	11/15								WN444	WN444-2
U074	40	AMA DC/DC CV		voltage overshoot at -55°C	GIDEP	FV5-A-14-01	E	WN442-1	ASL127-1	11/14	WN442	CLOS							
S051	08	TO-46/TO206AB pack		metallic migration within beads	ESA	EA-2014-EEE-7-A	E	WN440-2	ASL125-2	09/14	OPEN	OPEN	OPEN	OPEN	WN440-2	CLOS			
D053 F575	08	TLK2711 transceiver		over-consumption	GIDEP CNES	CE9-P-14-01 FA 1221iss.2	D	WN437-1	ASL115-1	05/14	CLOS					CLOS			
G077	04	IN5822		weakness of diode construction	GIDEP	RS2-P-16-01	E	WN433-3	ASL111-3	09/13	OPEN	OPEN	OPEN	WN433-2	CLOS				WN433-3
P010	41	PWBs		plating & general quality issues	ESA	EA-2014-EEE-3-B	P	WN431-3	ASL109-3	10/13	CLOS								
D043 F571	08	SRAM AT65609E		radiations - mutliple upset	ESA	EA-2013-EEE-2-B	D	WN430-1	ASL108-1	11/13									
F552	09	J412V relays		sensitivity to vibrations			E	WN424-1	ASL102-1	12/12									
G056	12	2N2920A & 2N3810		lifted insert in header in TO77/TO78	mfr CNES	NCCS CSTM1101 FA 1182 iss.2	E	WN405-2	ASL082-2	07/11									
F498	12	transistors SMD462 pack		bond lift after 6000 IOL cycles	GIDEP CNES	FV5-A-11-01 FA 1166 iss.3	E	WN389-2	ASL0065-2	12/10									
F468	40	DC/DC CV (SMSA & SMHF)		radiation TID sensitivity	GIDEP	MT2-P-10-01A	E	WN365-1	ASL0038-1	12/09									
G031	01	CWRxx capacitors		short circuit	ESA	EA-2009-EEE-7	E	WN364-5	ASL0037-5	11/09									
F366	01	TBJ capacitors		leakage current failed			Ec	cancelled (WN247)	cancelled	06/07									cancelled
F357	12	2N5666 JANS		wrong marking	GIDEP	EA-P-07-01	Ec	cancelled (WN235)	cancelled	04/07									
F209	10-11	THX-yy-zz heaters		humidity			Ec	cancelled (WN098)	cancelled	07/03									cancelled
G071	01	ceramic chip capacitors		cracks in ceramic						10/15							OPEN	OPEN	OPEN
F595	01	MHV ceramic capas		solder balls	GIDEP	EE6-P-15-01				07/15				OPEN	OPEN	CLOS			
G064	01	CKS06 capacitors		crack between end-cap and electrode						04/15	OPEN	OPEN	CLOS						
U076	08	VRG8666 regulator		SMD ceramic package cracked						07/15				OPEN	OPEN	OPEN	CLOS		
F593	08	HS1840xxx		ESD class decreased to 0						06/15			OPEN	OPEN	OPEN	CLOS			
F601	08	UCCX800, 1 to 5		EOS sensitivity	CNES	FI 1154 iss.2				10/15							OPEN	CLOS	

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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

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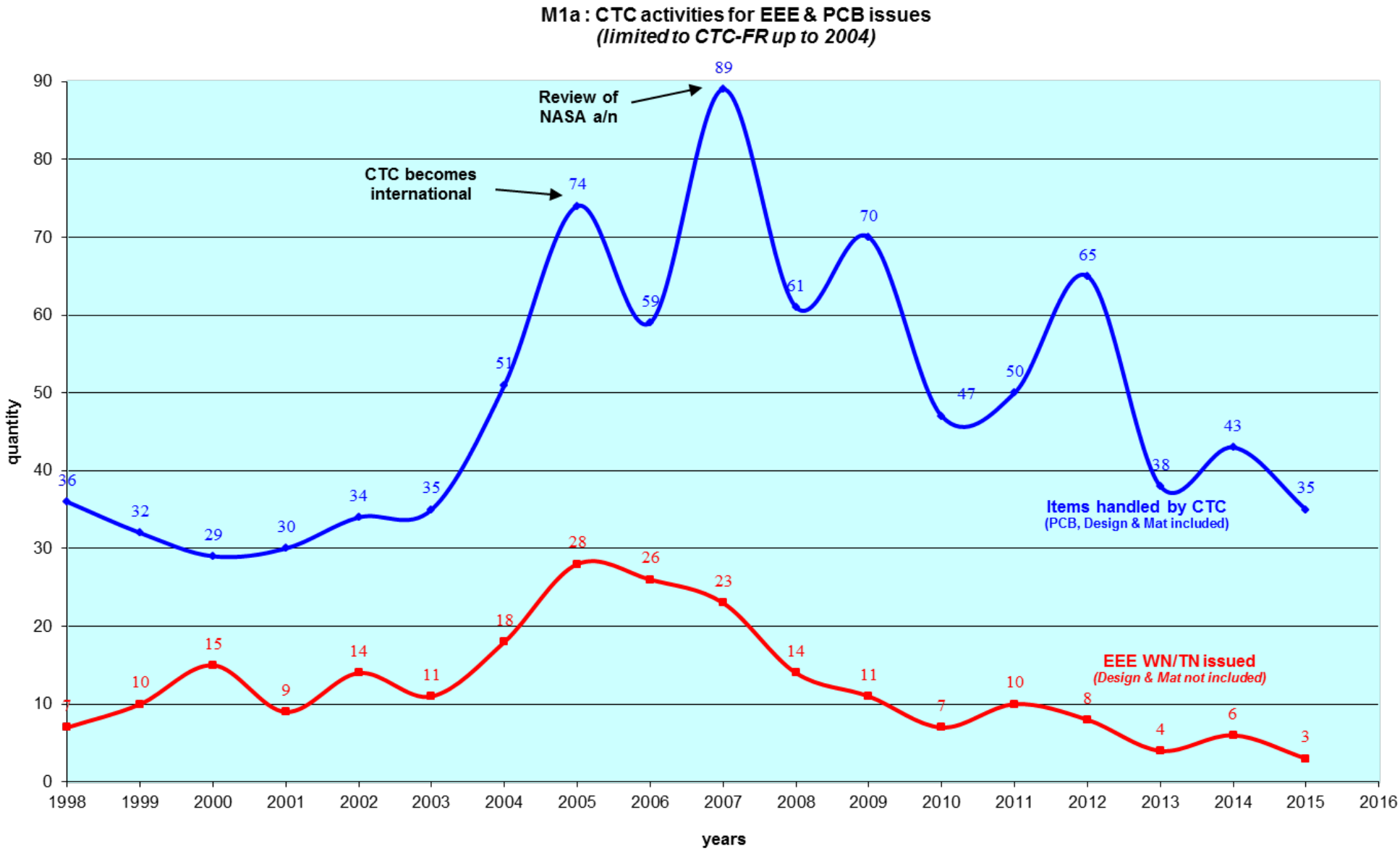
8. CTC metrics (2/4) – *CTC activities*



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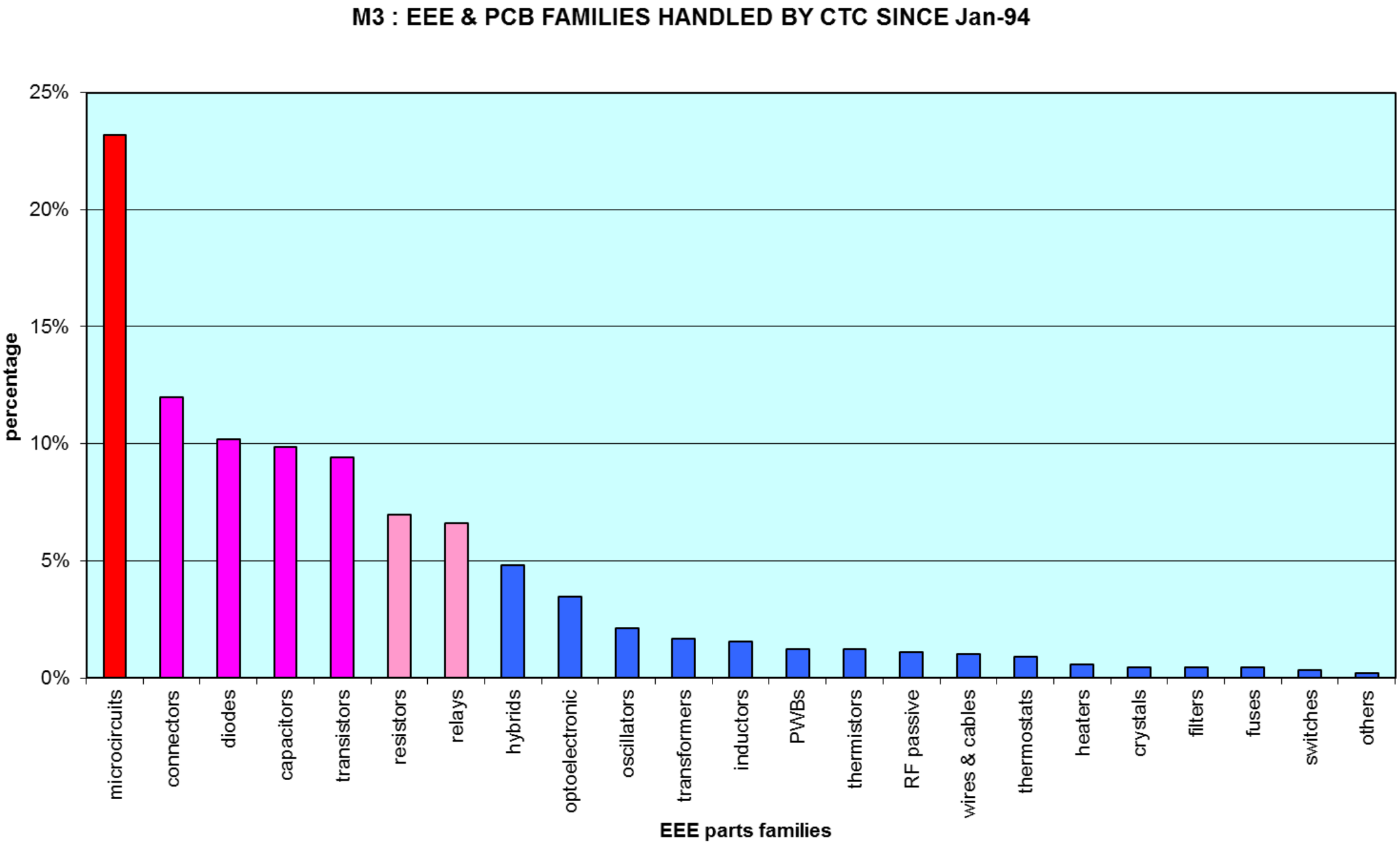
8. CTC metrics (3/4) – *Distribution per EEE/PCB family (based on >900 CTC items)*



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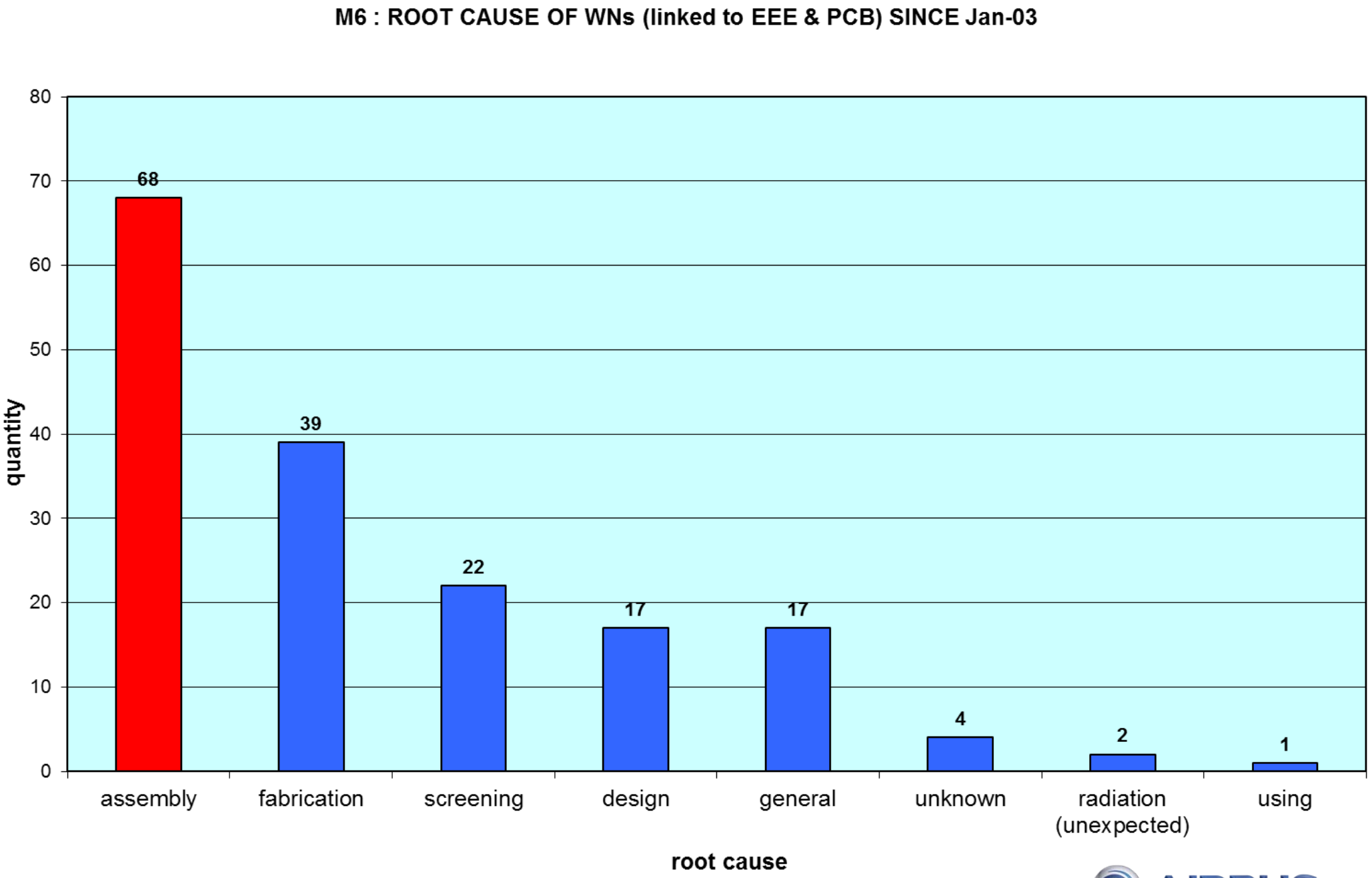
8. CTC metrics (4/4) – *Distribution per root cause (based on 170 WNs)*



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.