

Minutes of the ADS MRO & L Network NFF WG 02 – Held on 13 March 2013 at Cranfield University, Cranfield

Attendees:

Giles Huby (Chairman)	Copernicus Technology Ltd
Tony Weaver	Ultra Electronics - PALS
Vimbai Fedrick	MOD, Test & Measurement Policy
Chris Gorringer	Cassidian Test & Services
Peter Higgs	Peter Higgs Associates Ltd
Dave Kindred	BAE SYSTEMS
Jon Neal	Rolls-Royce
Joanne Lewis	Bombardier Transportation
Malcolm Wilkes	Boeing, Digital Aviation
Dr Samir Khan	EPSRC Centre in TES
Spencer Craigie	Merlin PT
Chris Klass	Selex ES
Mike Harrison	Retired
Angus Murray	BAE SYSTEMS
Chris Oakley	Cassidian Test & Services
Neil Pickthall	University of the Highlands & Islands, Perth Campus
Richard Pitman	Aviation, Aerospace & Defence KTN
Jim Cockram	Copernicus Technology Ltd
Dr Paul Phillips (Secretary)	EPSRC Centre in TES

Item 1 – Opening comments & introductions.

- 1.1 The Chairman went round the table for introductions and recapped the initial aims of the WG for the new attendees.
- 1.2 Richard Pitman gave the group an overview of the government's Aerospace Growth Partnership and details of new funding to develop an Aerospace Technology Institute.

Item 2 – Updates from ADS MRO&L Network

- 2.1 Richard Pitman updated the group on the last ADS MRO&L Network meeting held at Flybe in Exeter. It was noted that the NFF WG was not discussed at this meeting.

Actions

- The Chairman undertook to request that an update on NFF WG activities be included as a standing item on the ADS MRO&L Network's meeting's agenda.
- The Chairman undertook to arrange for the circulation of the ADS MRO&L Network's minutes.

Item 3 – Review outputs of the NFF symposium

3.1 The Secretary updated the group on the success and feedback of the NFF Symposium held at Cranfield the previous day – this was attended by 145 delegates representing 60 organisations. The event will be held again next year and Cranfield will be seeking sponsorship to cover the costs of the event.

Main themes that came out of the day included:

- Contractual/commercial barriers
- Information/data sharing across the supply chain
- Mapping field data back to FMECA predictions
- Standardisation of data capture and knowledge sharing

Item 4 – Updates on NFF research and other groups

4.1 The Chairman provided an update on the activities of the AIAA NFF Steering Committee.

4.2 The Chairman gave an overview of ARINC672, structure and content. Permission to distribute copies of ARINC 672 to the NFF WG members has been denied. However, there would be the opportunity at a later date for NFF WG members to join the AIAA NFF sub-committee tasked with reviewing and updating ARINC672. In that situation, the relevant individuals would be provided with access to the document. The Chairman would provide further updates at subsequent NFF WGs; meanwhile the ARINC672 document can be purchased online¹ by anyone who requires it.

4.3 The Secretary provided an update on the progress of the NFF research project within the EPSRC Centre in TES, including the details of several MSc and new PhD studies being undertaken in connection with the NFF research.

4.4 The Secretary also highlighted that there are opportunities for the group's work to be supported through Cranfield University MSc Student projects.

Actions

- (7/11/12) Contact the ADS MRO&L Network chairman to brief him on the progress of the NFF WG and to find out if NFF WG representation is needed at future MRO&L Network quarterly meetings. This had been carried out and NFF WG representation at these meetings had been agreed. **(Closed)**.
- (7/11/12) Brief the next meeting on the structure and content of ARINC672 – Industry guidelines for reducing NFF **(Closed)**.

¹ https://www.arinc.com/cf/store/catalog_detail.cfm?item_id=954

- (7/11/12) Obtain permission from the chair of the AIAA² NFF Steering Committee to distribute copies of ARINC672 to NFF WG members for review **(Closed)**.
- (7/11/12) Put Prof Jennions in touch with the Chair of the AIAA NFF Steering Committee, Mrs Lori Fischer, on the subject of NFF in mechanical components **(Closed)**.
- The Secretary is to:
 - Add new attendees to the NFF WG's online public area on 'Smartsheet'.
 - Obtain all presentations from the meeting and upload them to Smartsheet.

Item 5 – WG priority areas progress review

- 5.1 The 3 main areas of focus that had been agreed previously were: Taxonomy, Benchmarking and the Maintenance Data Review.
- 5.2 It was agreed that work in the area of data review had been concluded following a presentation on the scale and cost of the problem given by Wg Cdr Fergus Hawkins the day before at the NFF symposium. More details on this presentation can be found in the symposium report available from the Secretary.
- 5.3 Discussion of this agenda item concluded that the priority area for taxonomy would not be a main focus point for the group, as this was already part of the EPSRC TES Centre's project. Also there had not been strong support for providing data on NFF benchmarking. The group members were invited to submit their individual top three areas of concern, these were grouped together and it was decided that the new focus of the WG over the next 4 months would be to form 3 sub-groups to look at:
- Developing a NFF 'chain of events' map
 - Costs & Behaviours (comprising finance, commercial, cultural, KPIs and human factors)
 - Data & Diagnostics

The group was then split into two groups, one looking at Cost & Behaviours and the second Data & Diagnostics. A third groups examined all the issues that did not fit in the aforementioned 2 areas (referred to as the 'left-over post-it notes'). The aim was to identify challenges which could be delved into before the next WG meeting. The result of these group's initial discussions are attached at Annex A. The Secretary will also write to the WG distribution list asking for contributors for the priority area groups

² American Institute of Aeronautics & Astronautics

Actions.

- (3/7/12) TES Centre to publish Wiki for peer review of NFF taxonomy. This action was cancelled because it would be investigated by the TES Centre's NFF project instead. **(Closed)**.
- (7/11/12) It was agreed that the NFF WG would compile a NFF 'chain of events' flow-chart to provide a foundation for standardising taxonomy and identifying areas for improvement action. All attendees were requested to submit previous flowchart drafts and ideas to PP for co-ordination and review **(Ongoing)**.
- (3/7/12) The Secretary was to liaise with Wg Cdr Hawkins at Log NEC about access to LITS data for NFF analysis by the WG. **(Closed)**.
- (7/11/12) BA Maintenance (Phil Jones) undertook to provide access to maintenance data for NFF cost and impact analysis by the WG. **(Ongoing)**.
- The Secretary will write to the WG distribution list asking for contributors for the priority area groups
- The Secretary will assign a lead to the priority area groups.

Item 6 - Any Other Business

6.1 None

Item 7 - Date of Next Meeting

7.1 Date and Location TBC. Options for hosting the next meeting are invited from the WG members – suggestions at the meeting had included RR at Derby, BAE at Warton and ADS/AAD KTN offices in London.

Actions

- The secretary to organise the date and location of the next WG meeting.

Annex:

A. Priority Areas Review Output.

- Post-Its
- Draft Initial Objectives.

Annex A - Priority Areas Review Output

“Data & diagnostics”
<p>Data/ Information Management – how do we capture, share, understand and use information?</p> <p>“Exchanging Maintenance data through the repair life-cycle and across the supply chain”</p>
<p>Improved online and offline diagnostics to identify the root cause</p> <ul style="list-style-type: none"> - Investment - Validation of diagnostic results to fault lists - Symptom diagnostics - Smart systems - Test equipment support
<p>Fault Recording – Management of Data</p>
<p>Human influence</p> <ul style="list-style-type: none"> - Diagnostic design/support - Obtaining the correct/full data set to support the RCA - Ability of technicians to diagnose reported faults (e.g. training/equipment)
<p>Development of ‘practical’ solutions to prevent NFF → how to stop it happening?</p>
<p>Understand the blockers to emnacting previously made reccommendations</p> <ul style="list-style-type: none"> - REMM - ‘Ship or Shelf’/‘on hold’ policies - Data sharing
<p>Capture and cross communication of NFF events</p>
<p>Developemt of a roadmap for NFF improvement</p> <ul style="list-style-type: none"> - Potential upstreams
<p>Discussion Outcomes</p> <ul style="list-style-type: none"> ▪ Identify existing maintenance data sets ▪ Identify data set requirements to fully diagnose the root cause of the failure ▪ Identify the delta between the data provided and data required to achievbe the most effective diagnostics.

“Costs & Behaviours”
<p>Cost Modelling</p> <ul style="list-style-type: none"> -Direct -In Direct -Cultures -Contractors -Commercial
Commercial/Contracts (Best practise across industry sectors and recommendation for improvement)
Explore commercial arrangemens to change how NFF is managed
Explore the barriers which prevent progress-less talking more doing (Organisational behaviour)
Quick cost estimating
Getting the supplier to carry out a full root cause analysis (Investigation)
<p>Topics</p> <ul style="list-style-type: none"> -Value/Cost/Benefit -Contract structure -Gain/Risk Share
<p>Commercial Contracts</p> <p>How much will it cost me? “Money”</p>
<p>Identify Costs</p> <ul style="list-style-type: none"> -Objective -Draw in broader interests <p>Bench Marking + Contracting for NFF</p>
<ul style="list-style-type: none"> ○ State of NFF Doc/Review to promote WG (After Outputs Produced) =>Skills
<p>Discussion Outcomes</p> <ul style="list-style-type: none"> ▪ Case Studies/Examples <ul style="list-style-type: none"> -Hard Hitting -Factual ▪ Cost/Commercial approach across industries ▪ Behaviours=>Contact Supply Chain Structure <ul style="list-style-type: none"> -Flow through/down -Budgets -Incentives <p>→Road Blocks/Barriers To Change</p>

The left-over post-its

“Cross-Industry” – watching brief by the NFF WG
Common NFF language Military/commercial Objective: all sing from same hymn sheet
Definitions of intermittence in engineering context and mathematical context
Review existing industry activities What are they Scope/value/commonality

“Design” – consider incorporation in TES NFF project
Explore innovation/R&T Focus on higher TRL requirements
Review future of NFF with ac development i.e. more intelligent ac
A system view Roles & responsibilities of each group and the contribution or otherwise to NFF
Design Issues Recognise generic underlying causes of failure events that subsequently cannot be reproduced

“Management” – consider incorporation within NFF chain of events mapping activity
Managing NFF options - Not just fixes
Management of NFF - Including risk assessment type of approach
A generic process/procedure/standard
Management pressure/influence on operators/maintainers
Chain of events mapping