



International Investigations

Global Collaboration with Domestic Impact

United States – Pilatus PC-12, Butte, Montana

Dennis Diaz

Investigation

- Documentation and data gathering
- Wreckage exhibited extensive impact damage and fire-related damage
- No flight data or cockpit voice recorders on board
- Several components containing nonvolatile memory (NVM) recovered from wreckage



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Focus on Components

- One component with NVM was the central advisory and warning system (CAWS) computer
- CAWS provided system status indications and recorded event activation/deactivation in memory

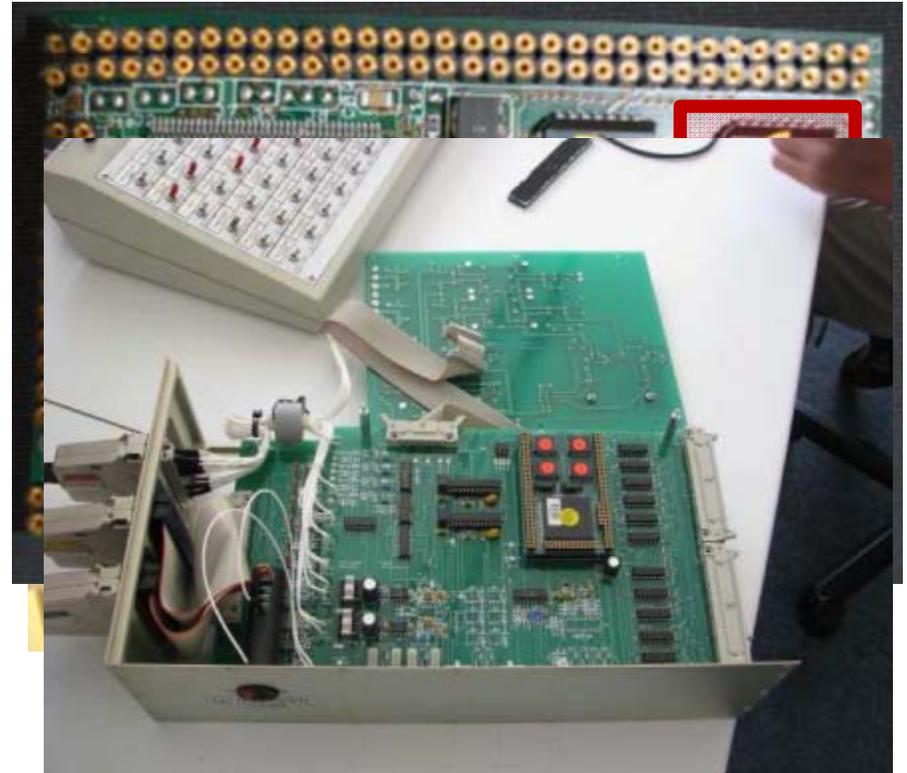


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Focus on Components

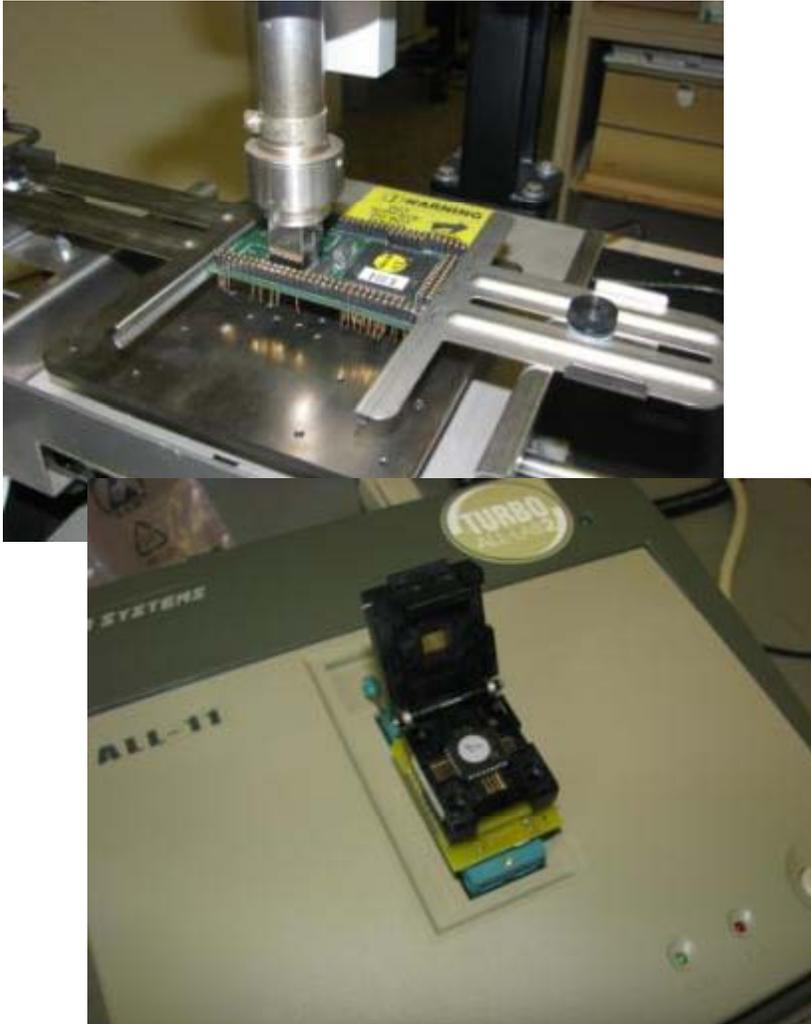
- CAWS computer was damaged by fire and impact
- Board containing memory chips survived
- Log data contained on chips '3' and '4'
- Data recovery attempted at manufacturer using surrogate CAWS
- Damage precluded data download



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Assistance From Abroad



- German Federal Bureau of Aircraft Accident Investigation (BFU)
- After attending initial download attempt, offered to assist
- Extracted chips from board
- Downloaded data from chips directly



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Assistance From Abroad

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Ety: 107904 F\No: 1559 Date: 31.05 0001 Time: 23:30:01 WNo 43 : A/P TRIM :Activated
Ety: 107905 F\No: 1559 Date: 31.05 0001 Time: 23:30:02 WNo 43 : A/P TRIM :Cleared
Ety: 107906 F\No: 1559 Date: 31.05 0001 Time: 23:30:10 WNo 43 : A/P TRIM :Activated
Ety: 107907 F\No: 1559 Date: 31.05 0001 Time: 23:30:11 WNo 43 : A/P TRIM :Cleared
Ety: 107908 F\No: 1559 Date: 31.05 0001 Time: 23:30:17 WNo 43 : A/P TRIM :Activated
Ety: 107909 F\No: 1559 Date: 31.05 0001 Time: 23:30:18 WNo 43 : A/P TRIM :Cleared
Ety: 107910 F\No: 1559 Date: 31.05 0001 Time: 23:34:49 WNo 43 : A/P TRIM :Activated
Ety: 107911 F\No: 1559 Date: 31.05 0001 Time: 23:34:49 WNo 43 : A/P TRIM :Cleared
Ety: 107912 F\No: 1559 Date: 31.05 0001 Time: 23:35:43 WNo 43 : A/P TRIM :Activated
Ety: 107913 F\No: 1559 Date: 31.05 0001 Time: 23:35:44 WNo 43 : A/P TRIM :Cleared
Ety: 107914 F\No: 1559 Date: 31.05 0001 Time: 23:38:49 WNo 43 : A/P TRIM :Activated
Ety: 107915 F\No: 1559 Date: 31.05 0001 Time: 23:38:49 WNo 43 : A/P TRIM :Cleared
Ety: 107916 F\No: 1559 Date: 31.05 0001 Time: 23:39:06 WNo 43 : A/P TRIM :Activated
Ety: 107917 F\No: 1559 Date: 31.05 0001 Time: 23:39:06 WNo 43 : A/P TRIM :Cleared
Ety: 107918 F\No: 1559 Date: 31.05 0001 Time: 23:45:06 WNo 43 : A/P TRIM :Activated
Ety: 107919 F\No: 1559 Date: 31.05 0001 Time: 23:45:06 WNo 43 : A/P TRIM :Cleared
Ety: 107920 F\No: 1559 Date: 31.05 0001 Time: 23:48:55 WNo 43 : A/P TRIM :Activated
Ety: 107921 F\No: 1559 Date: 31.05 0001 Time: 23:48:56 WNo 43 : A/P TRIM :Cleared
Ety: 107922 F\No: 1559 Date: 31.05 0001 Time: 23:50:14 WNo 43 : A/P TRIM :Activated
Ety: 107923 F\No: 1559 Date: 31.05 0001 Time: 23:50:14 WNo 43 : A/P TRIM :Cleared
    
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- Extracted files returned to CAWS manufacturer
- Manufacturer compiled software to decode data
- Decoded data returned to NTSB team

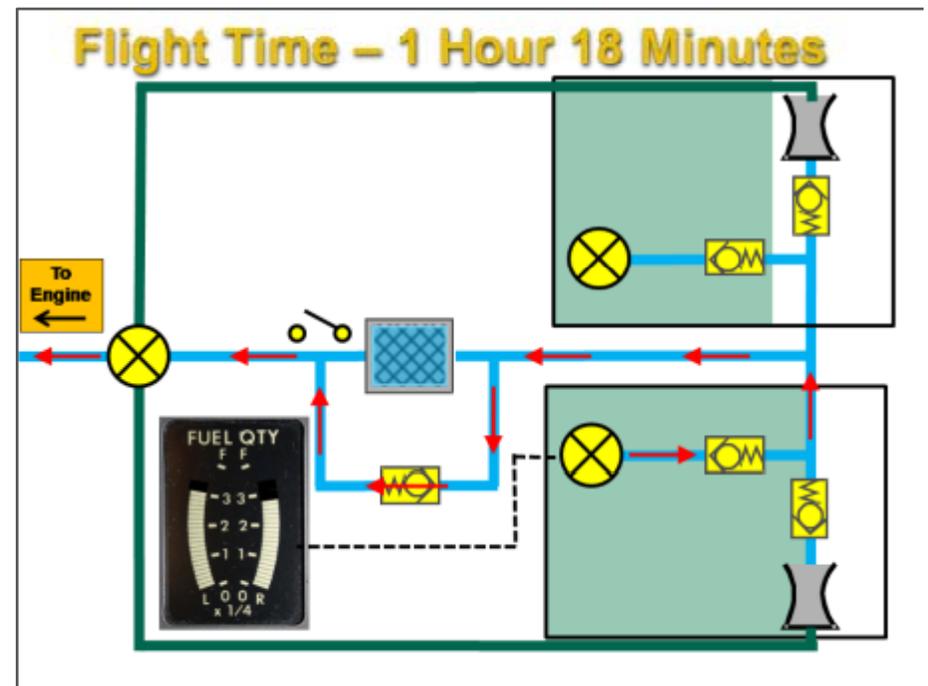
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000000660: 00 30 01 00 05 23 22 51 34 08 38 04 5F E0 00 00 .0...#"Q4.8.à..
000000670: 00 30 01 00 05 23 22 51 34 00 38 04 60 E0 00 00 .0...#"Q4.8.à..
000000680: 00 30 01 00 05 23 22 51 38 08 38 04 61 E0 00 00 .0...#"Q8.8.aà..
000000690: 00 30 01 00 05 23 22 51 39 00 38 04 62 E0 00 00 .0...#"Q9.8.bà..
0000006A0: 00 30 01 00 05 23 22 51 42 08 38 04 63 E0 00 00 .0...#"QB.8.cà..
0000006B0: 00 30 01 00 05 23 22 51 43 00 38 04 64 E0 00 00 .0...#"QC.8.dà..
0000006C0: 00 30 01 00 05 23 22 51 46 08 38 04 65 E0 00 00 .0...#"QF.8.eà..
0000006D0: 00 30 01 00 05 23 22 51 47 00 38 04 66 E0 00 00 .0...#"QG.8.fà..
0000006E0: 00 30 01 00 05 23 22 51 51 08 38 04 67 E0 00 00 .0...#"QQ.8.gà..
0000006F0: 00 30 01 00 05 23 22 51 52 00 38 04 68 E0 00 00 .0...#"QR.8.hà..
000000700: 00 30 01 00 05 23 22 52 16 08 38 04 69 E0 00 00 .0...#"R.8.ià..
000000710: 00 30 01 00 05 23 22 52 16 00 38 04 6A E0 00 00 .0...#"R.8.jà..
000000720: 00 11 01 00 05 23 22 53 03 0C 38 04 6B E0 00 00 .0...#"S.8.kà..
000000730: 00 11 01 00 05 23 22 53 28 00 38 04 6C E0 00 00 .0...#"S(.8.là..
000000740: 00 34 01 00 05 24 00 26 14 00 38 04 6D E0 00 00 .4...$.&..8.mà..
000000750: 00 00 01 00 05 24 00 26 19 10 39 04 6E E0 00 00 .0...$.&..9.nà..
000000760: 00 30 01 00 05 24 00 27 30 08 39 04 6F E0 00 00 .0...$. '0.9.oà..
000000770: 00 30 01 00 05 24 00 27 31 00 39 04 70 E0 00 00 .0...$. '1.9.pà..
000000780: 00 30 01 00 05 24 00 28 05 08 39 04 71 E0 00 00 .0...$. (.9.qà..
000000790: 00 30 01 00 05 24 00 28 06 00 39 04 72 E0 00 00 .0...$. (.9.rà..
0000007A0: 00 30 01 00 05 24 00 30 18 08 39 04 73 E0 00 00 .0...$.0..9.sà..
0000007B0: 00 30 01 00 05 24 00 30 18 00 39 04 74 E0 00 00 .0...$.0..9.tà..
0000007C0: 00 30 01 00 05 24 00 30 10 08 38 04 75 E0 00 00 .0...$.0..9.ù..
    
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Putting the Pieces Together

- Analysis of data validated by and supported with other information led investigation in new direction
- New understanding of accident flight system behaviors and operational factors
- Data proved pivotal in determining probable cause





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