Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Department of Defence,
Civil Protection and Sport DDPS
armasuisse
Aeronautical Systems

Swiss Experiences from F/A-18 ASIP Information Exchange

Military Airworthiness Conference 2018

Content

Summary

Operating common aircraft types in various national fleets also entails the existence of common technical safety risks. To mitigate identified 'unsafe conditions' effectively and to prevent hazardous or catastrophic events, competent airworthiness authorities should coordinate the necessary measures with each other and potentially the original manufacturers.

This presentation address the need for airworthiness information exchange and collaboration activities and present the Swiss Military Aviation Authority experience in this domain.

Introduction

ICAO requires that member States have a system to maintain the airworthiness of aeronautical products on their registry. As part of this system, States publish and exchange Mandatory Continuing Airworthiness Information (MCAI).

MCAI is provided by the State of Design to the different Civil Aviation Authorities, which define the corrective actions.

The ICAO convention not being applicable to state aircraft, Military Airworthiness Authorities are not unified in one process/platform to enable a proper exchange of information and views. Bilateral und multilateral initiatives were taken in the past to correct this situation for certain military aircraft.

The Need

Information about two crashes in Switzerland from public sources can raise the following questions by other MAAs:

- Why did I get this information by chance and not from the Swiss TAA?
- Who is my counterpart in Switzerland?
- Are the OEMs informed about the crashes?
- What happened?
- Is there a technical issue? If yes, are we affected?
- Should I do something with my own fleet? Should I inspect? If yes, what?
- Can I do something preventively to avoid such an issue?

The Solution

International Collaboration

- Between governments
- Aviation system specific
- Multilateral recognition nice to have but not a must

The Four Levels of Collaboration

Depending on the level of ambition, the engineering know-how and the number of airworthiness issues, four levels of collaboration can be envisaged:

1. Information exchange about airworthiness issues
2. Data exchange of test results (fatigue tests, flight test measurements, etc.)
3. Exchange of analyses, engineering investigations and methods
4. Work share in joint activities

The Four Levels of Collaboration

1. Information exchange about airworthiness issues

MAAs should promote the establishment of airworthiness information sharing networks among all users of the aviation system and should facilitate the free exchange of information on actual safety deficiencies.

The authority exchanges airworthiness information with other MAAs on a voluntary basis (no formal commitment) and is not accountable for the correctness of the information and is not required to check the applicability of this issue for other operators.

The other MAAs are responsible for assessing the applicability of the issue for their fleets (similar configuration, operational usage, operating environment) and for defining corrective actions.

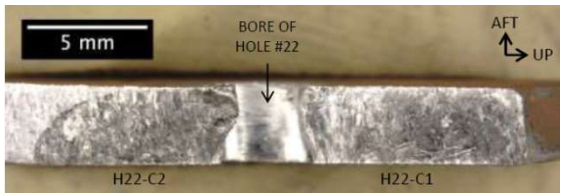
Depending on the sensitive nature of information to be exchanged, bilateral or multilateral agreements (like non disclosure agreements) may be required.

The Four Levels of Collaboration

2. Data exchange of test results

A Level 2 collaboration is not limited to fleet findings and covers potential issues identified during tests. The goal of this collaboration is to facilitate the free exchange of test data on potential safety deficiencies.

The other MAAs are responsible for assessing the applicability of the issue for their fleets and for defining corrective actions.



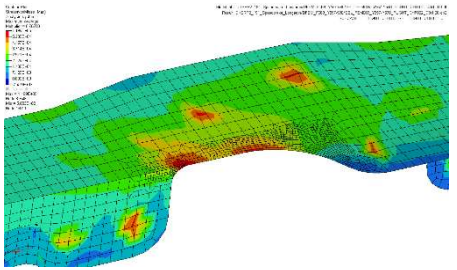
The Four Levels of Collaboration

3. Exchange of analyses, engineering investigations and methods

A Level 3 collaboration is characterized by the exchange of engineering analysis and methods like electrical load analysis, structural analysis, airworthiness risk assessments, lifing policies, etc. Engineering data can be shared free of charge, against payment or against compensation.

The other MAAs are responsible for determining the amount of credit that may be given to the provided data. The acceptability (processes, procedures, and finding authorities) and applicability of the data are assessed during this process. Existing multilateral recognitions can facilitate the assessment of the acceptability.

Depending on the sensitive nature of information to be exchanged, bilateral or multilateral agreements (like intellectual property rights) may be required.



The Four Levels of Collaboration

4. Work share in joint activities

Work (and cost) sharing in joint activities is the highest level of international collaboration and is characterized by the definition of common requirements and the work sharing between the participating bodies.

Example of International Collaboration

International collaboration is crucial to support the F/A-18 structural integrity activities.

The objectives of the F/A-18 International Structural Integrity Program (FISIP) Project Arrangement (PA) are to promote improved aircraft safety and availability and to reduce future costs for common F/A-18-related structural and fatigue analysis and repair efforts for the PA Participants' F/A-18 fleets.

Information exchanges under this PA are on a balanced, reciprocal basis such that the information exchanged among the PA participants if of approximately equivalent value.

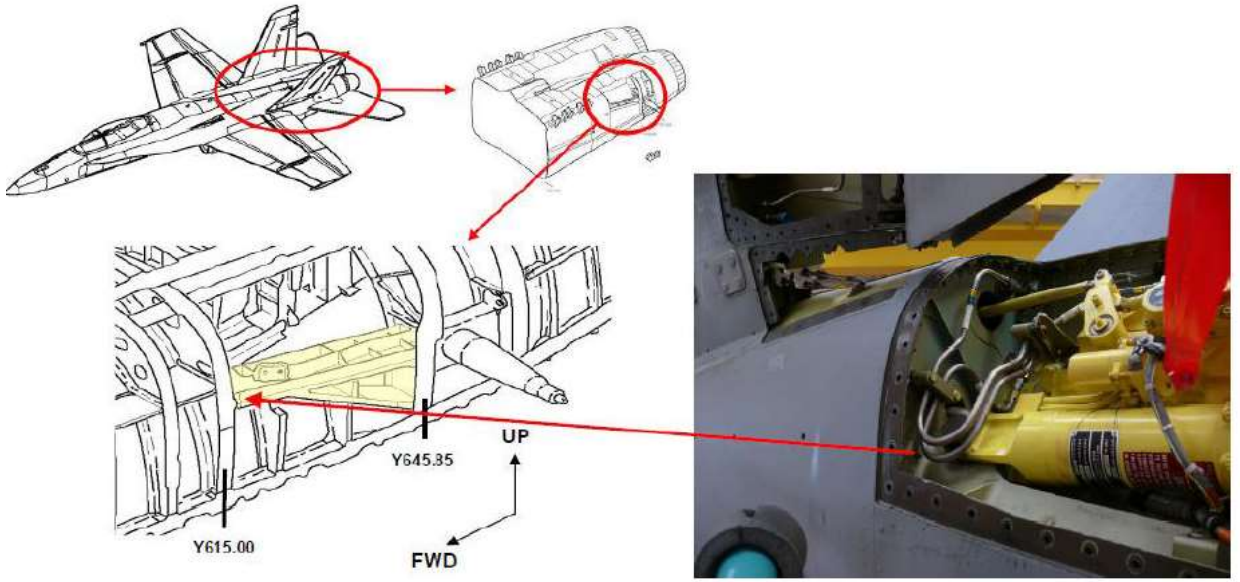
Most important meetings:

- F/A-18 International Structural Integrity Forum (FISIF)
- Composite Repair Engineering Development Program (CREDP)
- Non Destructive Testing Working Group (NDTWG)

Example of International Collaboration

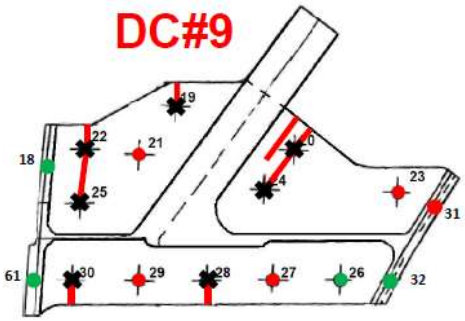
Example: Bootstrap

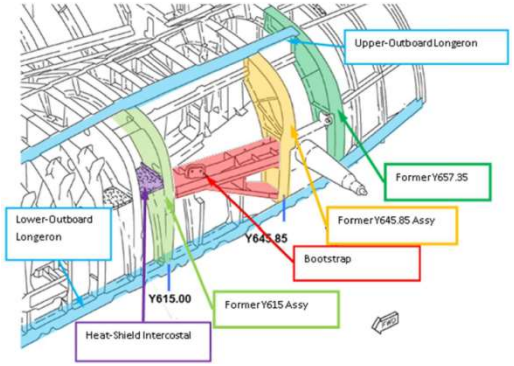
- Fracture critical part supporting the Horizontal Tail actuator
- Cracks discovered in the US and Australia
- Information distributed within FISIF
- Full Scale Fatigue Test findings at this location shared between the MAAs
- Airworthiness Risk Assessment provided by Canada



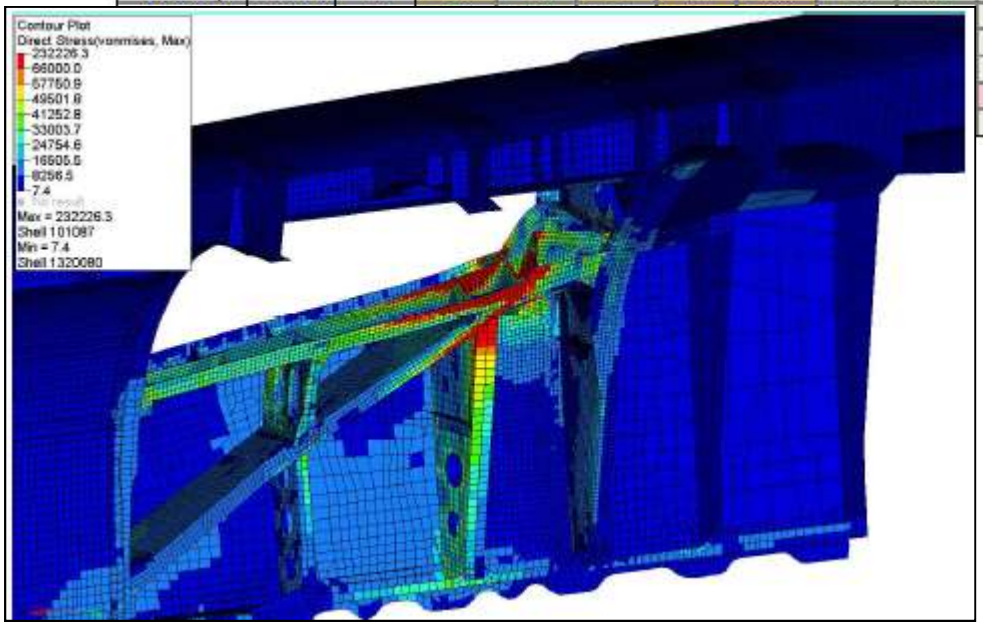
Example of International Collaboration

- Switzerland performed (free of charged) a detailed fail-safe analysis of the Bootstrap for the RAAF, RCAF and US Navy in 2015.
- Baseline FEM provided by the US Navy; loads by Canada and Australia.



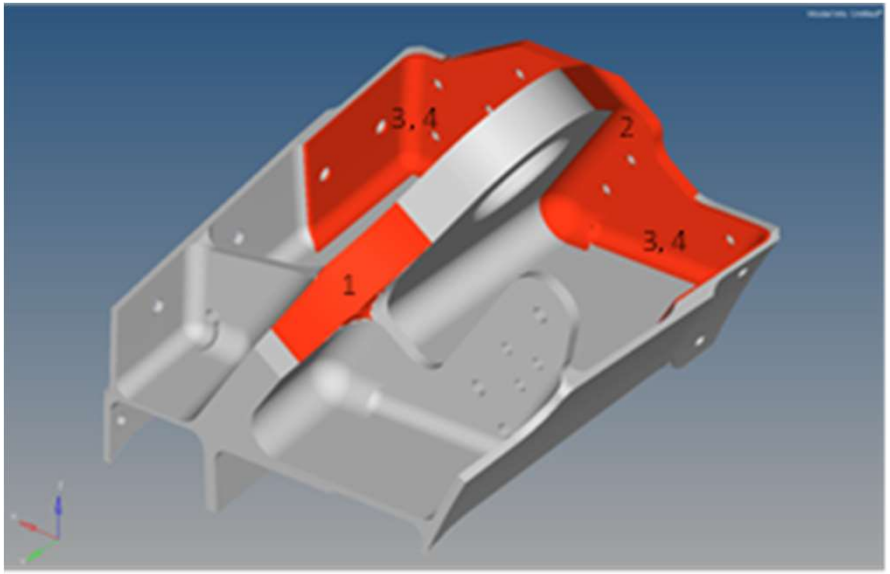


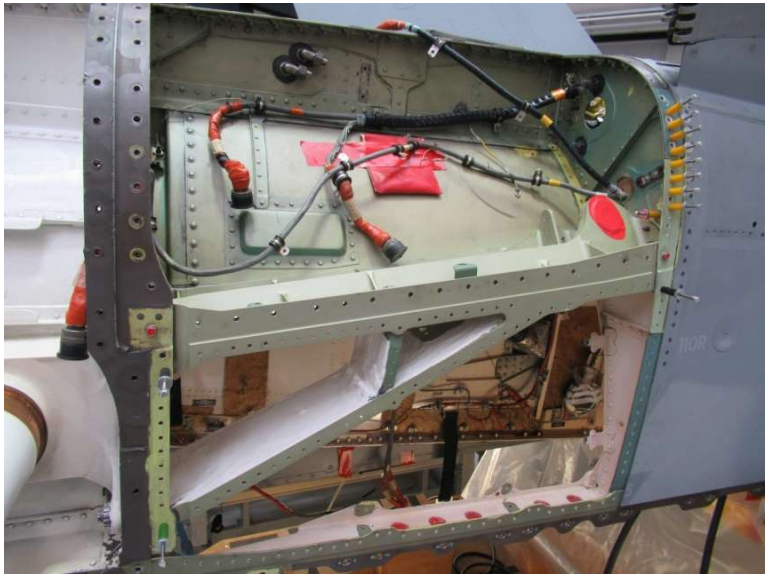
DC9			Fastener Shear Load [lbs] Loadcase								
Comp. Name	Node ID	Fast. ID	2007	2008	2009	2010	2011	2012	2013	2014	Max
Bootstrap	1002220	18	2318	2099	1656	1704	2104	1037	1243	2177	2318
Bootstrap	1002189	61	623	426	1155	1135	807	664	240	442	1155
Bootstrap	1002709	60	845	710	758	717	879	649	406	737	879
										674	802
										1628	1703
										1616	1717
										2294	2294
										619	619



Example of International Collaboration

- Finland performed flight tests to support fatigue analyses
- Switzerland developed a new bootstrap configuration leading to a major increase in fatigue life
- Switzerland provided detailed information about the new bootstrap to the FISIF community





Contact

Federal Department of Defence, Civil Protection and Sport DDPS
armasuisse
Christian Jaeggi
Head of Certification Office
Christian.Jaeggi@armasuisse.ch

Backup Slide

EDA to develop military airworthiness database
Brussels - 05 June, 2018

The European Defence Agency's Steering Board has given its green light to the development of a European Military Airworthiness Platform for Safety Information Exchange (EMAP SIX). This central database will enable participating Member States operating the same aircraft types to exchange airworthiness related safety information with relevant stakeholders on a need to know basis and in a secure environment.
Currently, the responsibility for processing this information is split between participating Member States' national authorities and other relevant aviation safety stakeholders. The establishment of a central database facilitating a uniform and consistent exchange of oversight information and obligations will provide for the further harmonisation of administrative processes used by participating Member States' National Military Airworthiness Authorities, reduce the related administrative burden and contribute to maintaining a high safety level. Beyond that, it will support further cooperation among EU Member States when joining efforts in development, procurement and operation of military aircraft systems.