NAA reader # R289047

Maroondan Qld

Mr David Tune AO PSM

Independent Reviewer

c/o Tune Review Secretariat

National Archives of Australia

Queen Victoria Terrace

Parkes ACT 2600

Dear Sir,

I would like to make a submission to your *Functional and Efficiency Review of the National Archives* with the accent of both function and efficiency.

I have been a user of the National Archives of Australia (NAA), since1986, as well as the national, military and other archives in many other countries including Canada, Papua New Guinea, Poland, the United Kingdom and the United States. I am researching historical matters of interest to me.

Many years ago the National Archives of Australia was a highly respected and excellent institution by world standards and was responsible for introducing practices later copied elsewhere.

Requests for access to files were dealt with promptly and if a researcher ordered documents on the day in Melbourne (Brighton) in the mid 80's they would usually appear within the next hour. Prompt delivery of documents is now but a happy memory.

Files must now be ordered at least five business days in advance and even when files are ordered two weeks in advance to coincide with interstate travel they may still be unavailable with no reason given.

On my last visit to the NAA in Canberra, November 2018, a number of the open files requested were not supplied and one of the desk staff graciously organised for them to be made available the following week. This necessitated my cancelling my return travel direct from Melbourne to the Coral Coast, rebooking Melbourne to Canberra to Sydney to Brisbane then home, and necessitated an overnight stop in Canberra.

Again several of the critical files were not available and I was told that some unknown person had cancelled the requests without identifying the reason so essentially I wasted most of the time and money spent on this very unwelcome detour.

In recent years the National Archives appears to have been starved of funds and far too many back room staff appear to operate on the basis of "she'll be right mate" and this is either condoned by the highest levels of management or they are failing to monitor their staff and the NAA's cataloguing and digitizing.

Therefore I have several topics I wish to address regarding the efficiency and effectiveness of certain aspects of the operations the National Archives of Australia (NAA) from a users perspective.

For convenience I will address these as separate topics with this single covering letter.

Some of my comments will be **very** blunt as some of the items I will be commenting on are far far below "home archives" standards, let alone the standards expected from any National body, and absolutely appalling from what should be a professional organisation that, until fairly recently, Australia could be proud of. The fact that the upper management and Advisory Committee have never stepped in to ensure that what should be basic standards are met is what is politely called appalling.

As a general rule I find the vast majority of the NAA "front counter" staff I have dealt with to be professionals totally committed to their jobs and to helping members of the public in every way possible. Only one was what I would call a job filler and showed no interest in solving a simple problem resulting from the NAA's "she'll be right mate" cataloguing. After a shift change I asked another person the same question and had a complete answer in under an hour.

Behind the front counter though I see a very severe lack of professionalism and a vast amount of "she'll be right mate" plus a significant amount of "let's make this as difficult as possible for the researchers."

My experience with other institutions including national and state and other libraries, here and overseas, is that the institution normally allows documents to be ordered from the catalogue with minimal effort, and for the researcher requesting the item to identify when they wish to view the document if they are on site or planning a visit.

If a researcher wishes to view documents at the NAA, the researcher has to:

- fill in a form which I would almost call hidden on their rather unfriendly web site, and
- attach a list which identifies each file not only by its barcode, but the title, series number, control number, location and access status.

All of this latter information is pointless, because counter staff advise they only use the barcode number and that no one checks any other details. Despite this a researcher must;

- write out all these details from the online catalogue,
- insert them in their own document,
- attach that document to the order form, and
- submit this material at least five business days in advance of any planned visit.

It is a most frustrating process. The additional data demanded serves no practical purpose and strongly indicates that the current management are more interested in discouraging research and than providing assistance despite what they claim in their *Service Charter*.

Ordering from overseas archives can be both simpler and more difficult. Some do not have an online catalogue, an item that NAA has at least made an attempt at providing (you will see later in Topic two why I only call it an attempt) and for that the NAA must given full credit. I congratulate them on being ahead of many other institutions such as the Smithsonian Institute, although they are now well behind organisations like Muzeum Lotnictwa Polskiego.

Some overseas facilities only provide paper and/or microfilm copies of files and at some you must order the file, using the acquisition number or barcode equivalent that the organisation uses, and then wait days or weeks for the digital files to arrive as CDs or electronic transfers or microfilm to arrive via snail mail. Again the NAA system of direct access is far more efficient and user friendly and again they are world leaders and must be congratulated for this. The NAA has been innovative on a number of fronts and on every one of those fronts they must be congratulated.

The NAA and some other institutions have embraced e-mail and you can correspond with them through that medium though slow answers are not unusual from the NAA. The Smithsonian Institute on the other hand allows on-line queries but replies solely by snail mail. Again the NAA is ahead of some other institutions and again they must be congregated.

Most of my comments following are related to unbelievably substandard output and substandard practices and what appears to be a complete and total lack of quality control, as will become evident. This continuing substandard output can only result in an further loss of reputation for the NAA as well as a significant increase in costs when errors are found and time must be "wasted" to correct these errors in an effort to salvage the NAA's lost reputation. For fragile documents there is also the risk of damage to the original such as tearing, creasing, oil and dirt from fingers, etc, especially when the original copying was done using practices that no archive that I know of other than the NAA uses and/or previously used. These practices are covered in more detail later in this submission.

Some of my comments may appear to be anti-NAA however I am most definitely an avid supporter of the NAA continuing and expanding and I very strongly hope that the NAA regains its past position in researchers eyes as one of the worlds foremost and most innovative Archives.

What I am strongly against are the (hopefully) small number of staff, and their managers, right to the highest levels, who obviously do not give a proverbial about the NAA's reputation, or about completing the work they are paid for, and entrusted with, to the standards required to maintain the NAA's previous well earned reputation.

The reputation of the NAA is being destroyed by these individuals and action must be taken to ensure all future output meets the highest standards thereby ensuring that the remainder of the staff, and researchers whose study depends on accurate cataloguing and quality digitisation, are able to once again refer to the NAA as one of the worlds foremost archives.

As a former Quality Assurance Manager with several international airlines I know you cannot fix quality problems or a poor quality culture unless you first identify all the systemic failures, and the root causes of those failures. In aviation, like in archives, record keeping must be absolutely fault free and the retention of aircraft records is as important as retaining any countries records. In the attached earliest Aerospace Standard all the text in bold is

over and above the requirements of the ISO standard. You will notice the majority of these additions relate to documentation and record keeping.

My submission is about clearly identifying those systemic failures that are evident to me, a user who has spent well under five hours per week over the last five years dealing with the NAA. I therefore have a very limited insight into the full catalogue of the NAA. A proper audit by persons employed as auditors by prestigious overseas institutions such as the American National Archives and Records Administration, the Smithsonian Institute and the British National Archives at Kew is desperately needed. That should be a part of your review but time and money will not allow this.

I have no way of knowing from this distance if the root causes of NAA's problems are

- purely internal and driven from the top down such as by upper management refusing to support lower level staff when the latter identify problems and propose realistic solutions, including the retraining of staff and the dismissal of those staff who continue to refuse to follow proper procedures after retraining, or
- if they are a result of lower grade staff knowing of a lack of interest in quality control by upper management means their errors will never be identified and they will never by penalised for any shoddy work, or
- caused by a combination of the above, or
- a case of too many chiefs and not enough Indians, or
- a result of external factors (unlikely).

I hope you will be able to identify these factors and create realistic solutions for them.

One issue that is clearly driven from the top is the failure to insist that all persons handling archive documents wear clean white single use gloves to prevent the oils, dirt and other matter on peoples hands damaging the paper.

Even small archives in Papua New Guinea have this provision but the NAA does not. The gloves cost just cents and the NAA should sell them for a small profit thus not only protecting the material but subtly providing a message, at no cost to the NAA, that these files must be handled with extreme care.

I would also recommend a subtle watermark on all electronic NAA files, something visible but not intrusive, so that unscrupulous companies in Australia and elsewhere cannot sell copies of NAA files without it being evident where the file originated.

Unlike JPG files, PDF files can easily have watermarks added plus editing and printing restrictions imposed on them, again protecting the file from unscrupulous people out to make a buck by pirating the NAA files. JPG files can be electronically marked but the average person who purchased a PDF created from JPG files would not be able to detect this.

Finally, before submitting my main objections I wish to comment on several other submissions. No other submission highlights the appalling cataloguing and digitizing standards practiced at the NAA so that will be my prime focus.

Almost every submission complains about the lack of funding for the NAA. Many say that funding needs to be more generous and to that I would add that a start should be to index the funding to both inflation and population growth as both those items result in a need for a higher level of funding.

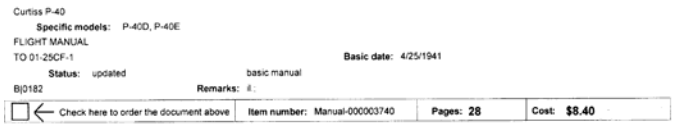
The almost universal complaints in these other submissions are

- that the various governments of the last ten years are financially crippling the NAA, and
- the cost of requesting digital and paper copies of files is greatly excessive.

I totally concur on both matters and question why there is no public benefit offset to the costing of all files other than military service files which are generally only of interest to the immediate family of that person.

Many overseas archives provide prints of documents for a modest cost - the National Air and Space Museum in the US charges just 30 cents per page. The NAA start at $2.79 per page (NAA *Fact sheet 51*) and then give every other user digital access to the exact same file free of charge. From any other institution this would be called unconscionable conduct and it cannot be justified on any grounds.

Using the example of the *P-40D & E Flight Manual*, purchasing a paper copy from the Smithsonian cost just US$8.40 for copying and UD$8.00 for postage. From the NAA the cost would be $42.00 plus postage and when I enquired some three years ago I was told you must be at the Canberra Reading Room in person to order and they will not post. This is not assisting research and researchers but deliberately hindering both.


Curtiss P-40
Specific models: P-40D, P-40E
FLIGHT MANUAL
TO 01-25CF-1
Basic date: 4/25/1941
Status: updated
basic manual
Bj0182
Remarks:
Check here to order the document above
Item number: Manual-000003740
Pages: 28
Cost: $8.40

Ordering **the first digital copy** of the same file from the NAA costs AU$39.90 and increases on July 1 this year. I have not asked if they would rescan in black and white but I suspect, given the refusal to photocopy and post the file example, that the answer would be no.

RecordSearch digitisation

An image of each page of the record and a searchable PDF is made available online for public viewing on RecordSearch.

Online copy of whole record	Cost incl. GST	Cost ex. GST
Small file (typically up to 10 pages)	$27.89	$25.35
Small-medium file (typically 11 to 50 pages)	$39.90	$36.27

Another common thread in other submission is the public service "efficiency" requirements are producing theoretical improvements but in fact the NAA is seen by the majority of researchers as going rapidly backwards..

Professor Anne Twomey and many others comment on the excessive delays in getting material declassified, in the professors case over 7 years with no indication that the documents will ever be released. This appears to be driven by what the general public would refer to, right or wrong, as the normal public service lethargy and obstructionism. I wonder how many files on her subjects were not found due to the catalogue errors listed below.

I have during my career been forced to deal with public servants who other members of the same department referred to as road blocks, though usually in more graphic and derogatory terms. It was said of one in particular by many of his colleagues that his next decision will be his second and that his first was never to make another decision. Cleary Professor Twomey is hamstrung by persons with the same philosophy in both the NAA and government agencies. In the publics eye this reflects badly on the NAA more than the agencies who are causing the problems because the public do not know which agencies are involved.

It is often said that there is nothing as mindless and stubborn as an anonymous public servant until they end up on the news. Routinely we see television stories where some anonymous back room self proclaimed genius has made a totally illogical decision to do with NDIS or welfare or tax or whatever and it is surprising how many of those decisions quickly get reversed once exposed to the news spotlight.

I would hate to see the NAA put under that spotlight because of some anonymous person in some government agency. Imagine the public outcry if Professor Twomey took her S44 or dismissal research delays to the press. Most would not care about the content of the complaint, just that some anonymous public servant was obstructing a government contractor from fulfilling the requirements of their contract, and many would be far more angry on what they would conceive as a *cover-up* on "the dismissal."

I am currently involved in a project where one government organization located at A insists all the records our team are seeking are kept at location B. Location B is equally adamant these records are all kept at location A and neither are willing to actually search their own locations records and files to determine where the files are in fact kept, which is probably at some, unknown to us, location C. This is another well known public service ploy to avoid work and decisions and actually helping researchers.

Most submissions suggest a 90 day limit for agencies to respond with any NAA request to carry out a review and then clear any file and I agree with this though I do add that the NAA must complete their review concurrently with any agencies so there is "final" a decision within 90 days. Agencies must be required to provide compelling evidence to justify that certain documents should remain closed in whole or in part and if the agency fails to provide such a justification within the 90 day period the file should be automatically released. Finally there needs to be an independent appeals process to the Commonwealth Ombudsman as a minimum. or to an Australian equivalent to the UKs *Advisory Council on National Records and Archives* as the much preferred option.

I would also, from painful experience, very strongly recommend that no original documents be sent to agencies for declassifying but instead that the file be digitized and the digital copy sent simultaneously to every agency that is known to have an say in the release of its contents, including the NAA reviewers.

I make this recommendation to digitise the file prior to submitting to the agencies for three very solid reasons.

First this eliminates the problem of agency one taking 89 days then agency two having no time so automatically saying no.

Secondly it prevents damage to fragile files as passing the file from person to person in each agency increases the damage, not only from tearing and twisting but also from the oils and contaminants on people hands, especially when the file is being processed by someone who does not bother to handle the document carefully.

Thirdly, and most importantly, it prevents the complete file, or a critical part of it, or even individual pages of a file, from being accidentally lost through rough handling, or worse still being deliberately lost.

In the mid 1980's while visiting the NAA in Brighton, Vic, I was looking through the index of the Essington Lewis papers at the suggestion of one of the desk staff. In there I found two files of great personal interest, the approximate titles being *Japanese aircraft under consideration for manufacture in Australia*, and *Negotiations with Sumitomo Metals for the manufacture of Japanese aircraft alloys in Australia*.

I applied to have them declassified. A few weeks later I received a letter from the NAA advising that the files were sent to the RAAF at Russell Offices for processing and they had been lost. The NAA should be able to provide you that letter. The letter offered several options. On my next visit I asked the desk staff for their recommendations. After reading the letter that person asked if the files could embarrass the RAAF. I replied it was highly likely as the file probably showed that the RAAF members of Essington Lewis's research team were aware of Japanese aircraft advances well before WW2. The NAA person then advised that it was a waste of time to do any follow up as the file had undoubtedly been deliberately destroyed to protect the RAAF's reputation.

The RAAF's resistance to releasing information is not new as can be seen in the newspaper articles reproduced on page 19 of this document. There are thousands of WW2 RAAF files that are still closed 74 to 80 years after creation and I am loathe to request any be opened due to the possibility that the pages we seek would disappear like the Essington Lewis files.

Professor Michael J. Socolow comments on the very restrictive opening hours at NAA. I ask you to also put yourself in my shoes and consider how you would feel about these hours if you were on a pension and had to travel some 2000+km each way to Canberra or Melbourne, with no direct flights, only to spend much of your time sitting around waiting for the archives to be open to the public. Then think of the unplanned accommodation and transport costs if you are unable to complete your research in the first week in Melbourne (or Brisbane).

This is not supporting research and hiding files away where no-one can ever see them is contrary to the whole purpose of archives, and much of what is preached on the NAA web pages.

The Australian Historical Association (AHA) highlights the lack of **independent** end user representation on the NAA's current Advisory Committee (the Committee) and I strongly support the AHA belief that the Committee must include independent user representation. I recognise that most of the Advisory Committee are past and/or present users of the NAA however they are all government appointees chosen because their views match those of the government of the day, not the wider research community. I repeat that the fact that the Advisory Committee has never stepped in to ensure that the NAA maintains what should be the most basic archival standards shows a lack of hands on research relating to their duties. On past performance I can see no chance of this Committee taking any corrective action. Unless it contains members who are completely independent of the government of the day and who are willing to stand up for the research community rather than those who appointed them I doubt this will change.

I would therefore suggest that both the AHA and PHA have representatives on the board as combined those organisations cover the broadest spectrum of the NAA's research users. I am not a member of either organisation but most of their concerns would be similar to the concerns of most other independent researchers and mine. This is not an unreasonable or groundbreaking request as the Australian International Air Services Commission had a consumer representative, Gabby Hollows, on its committee in the mid 1990's.

Even more I support the AHA suggestion for the creation of *an advisory council independent from the Archives which has the job of managing the task of assessing which records should be made available to researchers. The UK example is worth citing here where the Advisory Council on National Records and Archives is independent of the National Archives and 'represents the public interest in deciding what records should be open or closed' (http://www.nationalarchives.gov.uk/about/our-role/advisory-council/). It is telling that 'The Advisory Council regularly challenges government departments to provide evidence to justify requests for permission to retain documents or for them to remain closed'. This model is well worth considering.*

The submission by Mr Mark Zanker contains two items that I wish to comment on. Firstly I generally agree with the following statement with the proviso that only service personnel records be moved to the AWM. All other

military records should stay with the NAA as the AWM is even less user friendly when it comes to any records that do not relate to personnel.

3. I consider the appropriations to the NAA are insufficient, as indeed they are to most cultural organisations under Commonwealth control, with the exception of the Australian War Memorial, (AWM) which has received a disproportionately large share of the funds. Perhaps the task of digitising and releasing war service records should be transferred to the AWM as the NAA's resources could be better utilised in preserving other historical material of interest to the broader society. War service records are, of their very nature, much more likely to be of interest only to the relatives or associates of former service personnel than to the public at large.

12. (b) where paper records have deteriorated to the extent that they are illegible, they should simply be destroyed;

I do not support this recommendation for two reasons. Not only are there often existing better ways to digitize those files than are currently used by the NAA, as will be shown below, but there are other technical advances, already used by Police and other organisations, that already make many of those files readable at what is currently an unacceptable cost. These processes will become more affordable in the future, just as home document scanners have gone from unaffordable to under $100 in a few short years.

Thank you for your consideration of this submission. I can usually be contacted by email within 24 hours most times if you require more details. The nbn landline and internet are not reliable outside of major population centres. Nor is mobile phone reception reliable in this area.

Sincerely,

NAA reader # R289047

NB:

You have my full authority to:

- obtain my full details from the NAA, and
- to redact any of this submission before it is posted on line if you believe any of its contents being available to the NAA staff before you investigate their performance would hamper your investigations. This redaction approval is conditional on these redactions being removed before your report is released.

The NAA's official preservation standards are summarised on web page http://naa.gov.au/about-us/organisation/accountability/operations-and-preservation/preservation-digitisation-standards.aspx#section6 see a short extract below.

> **Preservation Digitisation Standards**
>
> **1. Paper documents (unbound) under A3**
>
> Archival documents in this category can include single folios, files and index cards. A file is a collection of documents held together in a folder. The documents within the file are often fastened together using staples, paperclips or pins. The types of documents found on a file can include:
>
> - documents and artworks on paper
> - photocopies and laser prints
> - thermal papers
> - maps and plans
> - photographs.
>
> Documents can vary in contrast and this may affect the requirements for producing a clear quality digital image. Documents with a well-defined print type with a high level of contrast between the ink and paper and with no discolouration or staining of the paper substrate can be scanned in 8-bit colour. Older documents, with handwritten annotations, poor legibility and low contrast between the text and paper, or where the substrate is faded or stained, should be scanned at a higher bit rate of 16-bit colour.
>
> Files containing multiple documents will be digitised to single page TIFF files, not to a multi-page TIFF.

- I will show, by scanning my copy of a file held by the NAA on a cheap home printer/scanner, that there is a better option to the sentence *Older documents, with handwritten annotations, poor legibility and low contrast between the text and paper, or where the substrate is faded or stained, should be scanned at a higher bit rate of 16-bit colour,* and
- I would also like NAA to address on their web site how one can search for the sub-documents identified in the last paragraph below ie: *Files containing multiple documents will be digitised to single page TIFF files, not to a multi-page TIFF.* This is addressed in Topic two following

I provide examples supporting this proposal.

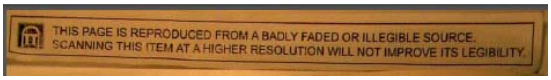
Attachment 1-1 image one is a document off the NAA site, scanned by NAA in colour.

Image two was scanned by me over five years ago using an original of the same document on a cheap domestic printer-scanner. Image three is a colour photo of my original.

There is a world of difference between the legibility of these prints. The page I scanned is clear and legible, unlike the NAA file. Printing both these pages results in a considerable amount of wasted printer ink when printing the NAA version, a further fail on both economic and environmental grounds.

Attachment 1-2 page one is a page from an unidentified NAA document which I purchased off the internet. This same document is referenced in other topics.

As you can see it has the standard NAA disclaimer used when a poor original is copied



Attachment 1-2 image two is the same page after it was printed in colour as an A4 on a cheap HP2131 home printer then scanned on the same unit as black and white image thus creating a third level copy. No other processing was carried out but it is again easier to read than the NAA copy even though it is a copy of a copy.

As you can see that the *badly faded or illegible source* has provided a far more legible page by scanning in black and white on what is almost a throw away quality scanner. NAA scanners **should** be much higher quality and should achieve a somewhat better result.

Therefore I submit that:

> *Older documents, with handwritten annotations, poor legibility and low contrast between the text and paper, or where the substrate is faded or stained, should be scanned* ***at a higher bit rate of 16-bit colour.***

should be changed to read the following, as a bare minimum.

Older documents, with handwritten annotations, poor legibility and low contrast between the text and paper, or where the substrate is faded or stained, should be scanned ***at the same ppi in black and white.***

As my examples show this provides a far more readable document and the purpose of digitizing documents is to ensure the information contained in them is retained and is as legible as possible so that researchers can make informed and accurate decisions when writing on the topic.

The object of the exercise should always be to preserve the knowledge on the page. The colour of the ink and paper are immaterial and, where that information is *badly faded or illegible* the choice should always be to preserve the information rather than the background.

I would further recommend that every two colour file (black on white, black on brown, etc) be copied in black and white for the same reason with the additional benefit that if the user prints a scanned page they will get a clear crisp copy rather than one with a small to massive amount of background noise that reduced the readability of the document and wastes ink and other resources. For the same reason white on black should be offered as black on white as a PDF. In many image processing packages that is no more difficult than simultaneously pressing two keys.

An additional benefit is that Black and White (2 bit) files are smaller reducing the NAA's storage and internet transmission costs.

Preservation Digitisation Standards

1. Paper documents (unbound) under A3

Archival documents in this category can include single folios, files and index cards. A file is a collection of documents held together in a folder. The documents within the file are often fastened together using staples, paperclips or pins. The types of documents found on a file can include:

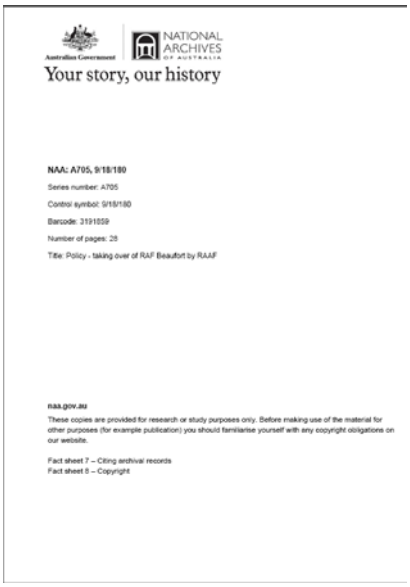
- documents and artworks on paper
- photocopies and laser prints
- thermal papers
- maps and plans
- photographs.

Documents can vary in contrast and this may affect the requirements for producing a clear quality digital image. Documents with a well-defined print type with a high level of contrast between the ink and paper and with no discolouration or staining of the paper substrate can be scanned in 8-bit colour. Older documents, with handwritten annotations, poor legibility and low contrast between the text and paper, or where the substrate is faded or stained, should be scanned at a higher bit rate of 16-bit colour.

Files containing multiple documents will be digitised to single page TIFF files, not to a multi-page TIFF.

I would like NAA to address on their web site how one can search for the sub-documents as identified in the last paragraph of the screenshot above ie: *Files containing multiple documents will be digitised to single page TIFF files, not to a multi-page TIFF.*

This requirement above makes sense only if there is a searchable index of these subdocuments. It is desirable but not essential that researchers can download just the identified subdocument. From what I can see no such index of sub-documents exists and there is no ability to download the subdocument separately except as page by page. In most cases at present a user is better off downloading the complete PDF and just printing the pages they are interested in. Because the NAA PDF's are locked users cannot extract the pages of interest so if they want an electronic copy of the sub-file they must print and rescan.


Your story, our history

NAA: A705, 9/18/180

Series number: A705

Control symbol: 9/18/180

Barcode: 3191859

Number of pages: 28

Title: Policy - taking over of RAF Beaufort by RAAF

naa.gov.au

These copies are provided for research or study purposes only. Before making use of the material for other purposes (for example publication) you should familiarise yourself with any copyright obligations on our website.

Fact sheet 7 – Citing archival records
Fact sheet 8 – Copyright

There are several methods for producing these sub document indices for existing digital files.

Firstly having every single digital file re-examined to identify the sub-documents and related documents - costly and time consuming, desirable but not essential.

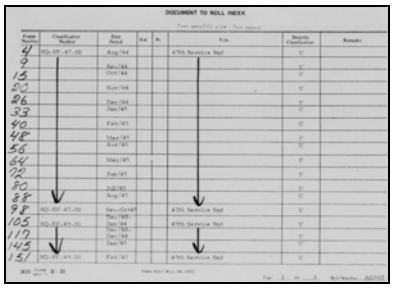
Secondly by insisting that all new files digitized have all sub-files and related files identified. At least part of this process already exists as shown in barcode 1056176 where it refers to *WILKINSON Robert Henry - (Flying Officer); Service Number – 408130.* A search for *Service Number – 408130* produces three files on that person. Given the *"She'll be right mate"* cataloguing shown below this process is almost certainly only carried out at random and those cataloguers that do provide this information must be applauded.

Thirdly by changing the cover page template. By adding a section to the cover page that comes with every NAA PDF file, shown on the right, requesting researchers to log on to a specific web page and record any sub-documents found in older files and to identify any errors in the cataloguing.

As you can see there is no shortage of room on the cover page to add this detail, and to add a list of subdocuments. It may in fact be easier to replace the text of the cover page with a copy of the complete *Details report* shown on page 18 under the header *Your story, our history.*

In the USA the Air Force Historical Research Agency (AFHRA) has an arrangement of some sort with http://airforcehistoryindex.org/ whereby the Air Force History Index volunteers have digitized the AFHRA sub indices and presented them as a web site. Many researchers are willing to provide such material back to the source so the NAA should embrace this policy.

This volunteer feedback changes the almost meaningless one page AFHRA index on the left image below to the 162 entries in the right image.



User feedback further improves this to:

Page	Date period	Subject
538	26 Jul 42	Tentative instructions for operation Tulsa II
546	29 Jul 42	Availability of reserve aircraft - predictions
563	29 May 42	Formation of TIAC to evaluate captured equipment
569	Dec 41 - Aug 45	RAAF weekly aircraft status reports starting 7 Dec 41
573	2 Jul 42	Historical record Air Trans Cmd Jan-Jun 42
575	26 May 42	Receipt for Dutch NEI aircraft
576	8 Apr 42	Details of Dutch aircraft

A win-win for everyone at no cost to the archive accepting the user input.

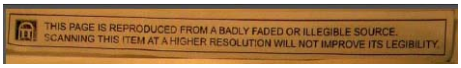
See my conclusions for another practical solution.

I draw your attention to the appalling cataloguing and dating of files which is far too common on the narrow range of files I seek to view at or from the NAA. Almost certainly this deficiency applies to all other subject areas thus bringing great discredit not just to the persons who caused these errors but to all levels of the management and staff of NAA, especially those responsible for allowing these deficiencies to exist and multiply. Given that many of the Advisory Council are users I am dismayed that they have failed to note these errors and/or find them acceptable.

Given my experience with the very professional performance of most face to face staff I have dealt with this back room "she'll be right mate" attitude needs to be eliminated if the NAA is ever to regain the high esteem it was held with in the past. The NAA was once a world leader, now even some PNG archives have better practices.

I am going to provide two distinctly different types of examples of this "she'll be right mate" cataloguing.

For my first type of example I am including, as Attachment 3-2, a file that I purchased off an American website. If you look on file page 24 it contains the Australian Archives statement shown here so obviously this document came from the NAA and almost certainly as an digital copy. Note also that all USAAC Technical Orders (TOs) have a page A immediately behind the Title page but this is missing from the NAA file as is page 2 of the original document. This type of TO also normally has a *Section VII* which was not copied from the original document. The image at the top of page 4 shows the original file has 28 pages. The NAA copy has 25 pages.



"*She'll be right mate*" strikes again.

I wished to purchase a properly done black and white photocopy of this file as that the digital copy is very substandard for multiple reasons. See Topic four. For cost and quality reasons I ordered from the Smithsonian.

I have used the NAA advanced search page using every logical keyword and found absolutely no trace of this file. Obviously the cataloguing for this document has not been done accurately, **or** it is a subdocument in a larger file.

The keywords I have used to search the NAA catalogue include Curtiss (the maker), P-40 (the correct model designation), P40 (the lazy mans designation), Kittyhawk (the RAAF name for the type), Warhawk (the US name for the type), Flight Instructions, Pilots Notes (what the RAAF call Flight Instructions), Air Corps, USAAC, USAAF and 01-25CF-1 (the Air Corps document number), all to no avail.

Incidentally there are multiple ways that this page can be scanned that will produce a far more legible copy which I covered in Topic one.

The easiest way I can demonstrate the appalling indexing of this particular document is to ask you to call in the highest level person responsible for cataloguing and set them this challenge.

Give that person a copy of the title page and page 24 from attachment 3-2 and ask them to show you, using only a public computer or smart phone and only the web pages available to the general public, how to find this document.

Topic two probably relates to the difficulty in finding this document as the hand written *No 3* and *5B* in the top right corner of the title page may well indicate this document is part of a file of another name.

For my second type of example of "she'll be right mate" cataloguing at the NAA my examples are:

In the screenshot below

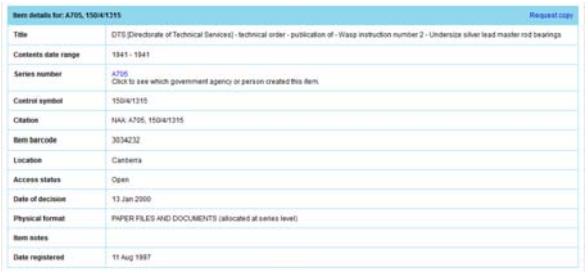
1. what is the subject of Instruction 22? **That is the primary information that a researcher needs to know and that needs to be available without having to contact the NAA.**
2. *DTS [Directorate of Technical Services]* contains redundant information. Anyone searching for this type of material knows *DTS* stands for *Directorate of Technical Services* so that can be left out thereby providing adequate characters for the file subject. See the first of the next two screenshots for why this matters.

Item details for: A705, 150/4/1309	Request copy
Title	DTS [Directorate of Technical Services] - Publication of Technical order wirraway Instruction number 22
Contents date range	1941 - 1941
Series number	A705 Click to see which government agency or person created this item
Control symbol	150/4/1309
Citation	NAA: A705, 150/4/1309
Item barcode	1119843
Location	Canberra
Access status	Open
Date of decision	13 Jan 2000
Physical format	PAPER FILES AND DOCUMENTS (allocated at series level)
Visibility and availability indicators	26. No issue outside the Archives - age related
Date registered	12 Aug 1997

In the two screenshots below which index entry is correct and what is the subject of the left screenshots file? Obviously both cannot be Wasp Instruction number 2 as master rod bearings would **never** have a Wirraway order number.

In the first screen shot below it is possible, though I believe unlikely, that there was insufficient space to write the subject because the redundant *[Directorate of Technical Services]* takes up too many characters to provide the characters required for the subject to be recorded. I suspect it is more likely that the person creating the catalogue entry was just too lazy to record it. *"She'll be right mate" and or "I do not give a proverbial?"*

Item details for: A705, 150/4/727	Request copy
Title	DTS [Directorate of Technical Services] - Publication of Technical Order - Wasp instruction number 2 - Wirraway instruction number 9
Contents date range	1940 - 1940
Series number	A705 Click to see which government agency or person created this item.
Control symbol	150/4/727
Citation	NAA: A705, 150/4/727
Item barcode	1046905
Location	Canberra
Access status	Open
Date of decision	19 Oct 1993
Physical format	PAPER FILES AND DOCUMENTS (allocated at series level)
Visibility and availability indicators	25. No issue outside the Archives - age related
Date registered	06 Aug 1997



Item details for: A705, 150/4/1315	Request copy
Title	DTS [Directorate of Technical Services] - technical order - publication of - Wasp instruction number 2 - Undersize silver lead master rod bearings
Contents date range	1941 - 1941
Series number	A705 Click to see which government agency or person created this item.
Control symbol	150/4/1315
Citation	NAA: A705, 150/4/1315
Item barcode	3034232
Location	Canberra
Access status	Open
Date of decision	13 Jan 2000
Physical format	PAPER FILES AND DOCUMENTS (allocated at series level)
Item notes	
Date registered	11 Aug 1997

In the screenshot below This file applies to T-56 turbine engines so the absolute earliest possible start date for this file is 1958, not 1929. Note also ***Iterim*** instead of ***Interim***. Such spelling errors are common and make searching by using a correctly spelt keyword miss such files, see below for another example of this.

Item details for: A705, 73/3/561	Request copy
Title	Iterim provisioning review - Allison Engine Spares and Tools
Contents date range	1929 - 1960
Series number	A705 Click to see which government agency or person created this item.
Control symbol	73/3/561
Citation	NAA: A705, 73/3/561
Item barcode	1121647
Location	Canberra
Access status	Open
Date of decision	25 Mar 2014
Physical format	PAPER FILES AND DOCUMENTS (allocated at series level)
Visibility and availability indicators	41. Withdrawn permanently
Date registered	19 Apr 1994

In the screenshot below the file folder says Kittyhawk (**P40E**) but the cataloguer has typed Kittyhawk (**PEOE**). How is a researcher supposed to find this file if using P-40 or P40 as their search keyword?

Title	Report on Comparative Tests. Capstan v. Kittyhawk. (PEOE)
Contents range	1942 - 1943
Series number	A1196
Control symbol	1/501/478

I would be very surprised if the original file below included in the title *(United State of America) (USA) Air Corps*. I suspect that the person who created this file guessed what USAAC meant, arriving at *(USA) Air Corps*, because they were too lazy to open the file and actually find that it means US Army Air Corps. Note also the spelling of Firearms. Again a keyword search would fail.

Item details for: MP508/1, 305/765/594	Request copy
Title	Issue of permits under regulation 9 of National Security (Fairearms & Explosives) Reg to Officers of (United State of America) (USA) Air Corps

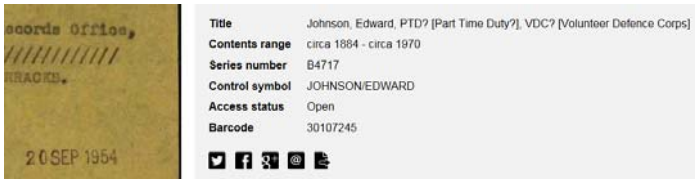
Dating of files is also heavily infected with the "*she'll be right mate*" as identified in the T-56 item above. Quick searches using each of the search terms *Beaufort, Kittyhawk* and *Wirraway* respectively show many such errors. See attachment 3-1. These continuous errors show a systemic management failure and total absence of quality management.

The first discussion of what later became the Wirraway project commenced in 1936 yet some cataloguer at NAA decided that 01 Jan 1800 was near enough for both the start **and finish** dates some files. Normally any RAAF file folder has a start date in the top right quarter of the cover so this is either just plain laziness, *I don't give a proverbial,* or petty bastardry. Finish dates are on the cover of most files so again the above "*she'll be right mate*" applies.

The Beaufort project dates are also often wrong (a search using Beaufort as the keyword finds hundreds of entries on Beaufort the town and Beaufort as a street name. Using Date as a search item misses many files because they are wrongly dated.

Kittyhawk dates are often wrong and at least 73 Wirraway files have impossible dates.

Here is one of dozens of Volunteer Defence Corps records with wrong dates. This file contains two letters, dated 26 Aug and 20 Sep 1954, and an ID



Title	Johnson, Edward, PTD? [Part Time Duty?], VDC? [Volunteer Defence Corps]
Contents range	circa 1884 - circa 1970
Series number	B4717
Control symbol	JOHNSON/EDWARD
Access status	Open
Barcode	30107245

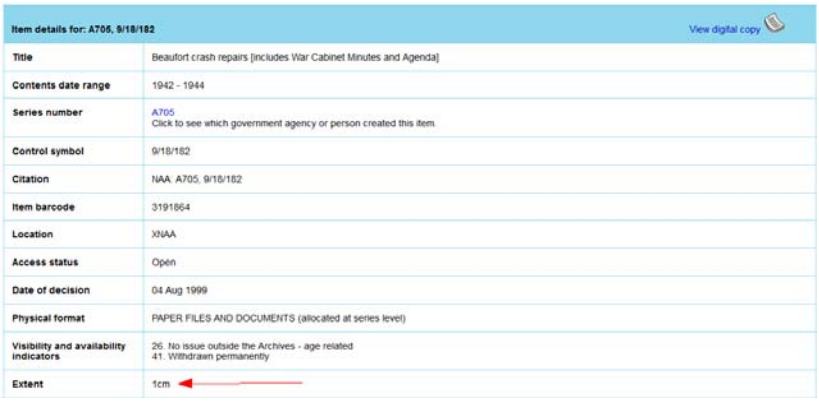
card dated 15/11/42.

NAA date the file ***circa 1884 - circa 1970*** and the file folder, which nearly always contains the start date, was not included in the digital file.

Need I say it? *She'll …..*

The third issue with file cataloguing is that when a file size is indicated (not a common practice) it is always the file size in centimetres. When a file has been digitized surely this could or should say *n pages* or *n pages / n cm*.

For example in the entry below there are 96 pages.



Item details for: A705, 9/18/182	View digital copy
Title	Beaufort crash repairs [includes War Cabinet Minutes and Agenda]
Contents date range	1942 - 1944
Series number	A705 Click to see which government agency or person created this item
Control symbol	9/18/182
Citation	NAA: A705, 9/18/182
Item barcode	3191864
Location	XNAA
Access status	Open
Date of decision	04 Aug 1999
Physical format	PAPER FILES AND DOCUMENTS (allocated at series level)
Visibility and availability indicators	26. No issue outside the Archives - age related 41. Withdrawn permanently
Extent	1cm

I draw your attention to the "she'll be right mate" attitude evident in the scan and photograph quality at the NAA.

Historically, before modern scanners, loose leaf archives were photographed or microfilmed rather than scanned as the high intensity light from early scanners would damage the paper and ink.

Modern scanners use much lower light levels and this problem is effectively negated.

Poor photographic practices can also cause the same and worse damage, including tearing, creasing, oil and dirt from fingers, etc, especially where the document is floodlit instead of illuminated by diffused light. This condition is evident in many NAA photographed documents and is standard in the reading rooms - see photo on page 15.

There have been special cameras for Archive quality photographs of bound documents for over 40 years but there is no evidence that the NAA has any of them or uses any of them.

Another case of "she'll be right mate" or a lack of resources? Many commercial archival book cameras cost over US$150,000 but fortunately well designed camera kits for archiving bound and loose leaf books cost as little as US$1,700, and some can even by made locally.

1. Mistreatment of documents during photographing

Lets look at Attachment 3-2 again.

No person committed to the preservation of old and fragile documents is too lazy to remove the binding clips and rusty staples from a loose leaf document yet it is evident that this whole manual was photographed while still stapled together rather than first removing the metalwork. Look at pages 4, 10, 12, 14 etc for the clearest evidence of this. This is not an exception - I can provide many more examples of this practice.

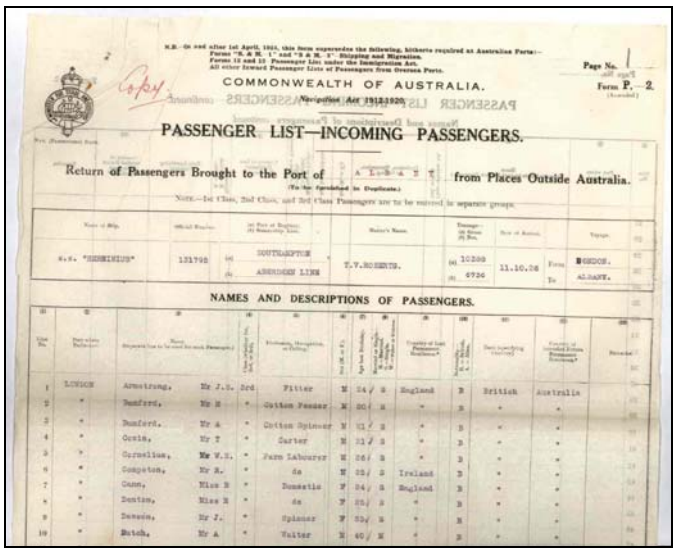
Note also that all USAAC Technical Orders have a page A immediately behind the title page but this is missing from this file as is page 2 of the original document. "She'll be right mate" strikes again?

I submit a properly trained archivist would have copied the document in black and white with the scanner set to auto exposure and to automatically crop the page to the size of the original, or with a proper archivists camera. See more below on this topic.

2. Prevention of bleed through

Page 24 of Attachment 3-2 as photographed is showing bleed through from page 23. In most cases if a document is scanned properly little or no bleed through is evident.

The pages below from file BC 30241531 have a classic case of bleed through in a very recently scanned document chosen on June 26th from the NAA SODA website (http://soda.naa.gov.au/) as *new in the last 30 days*. Ask the senior manager in charge of scanning to rescan those pages in your presence using a black pressure plate on the scanner like was used in some other pages found on the SODA site on the same day. The scanner pressure plate is the part that presses the paper against the scanner glass.

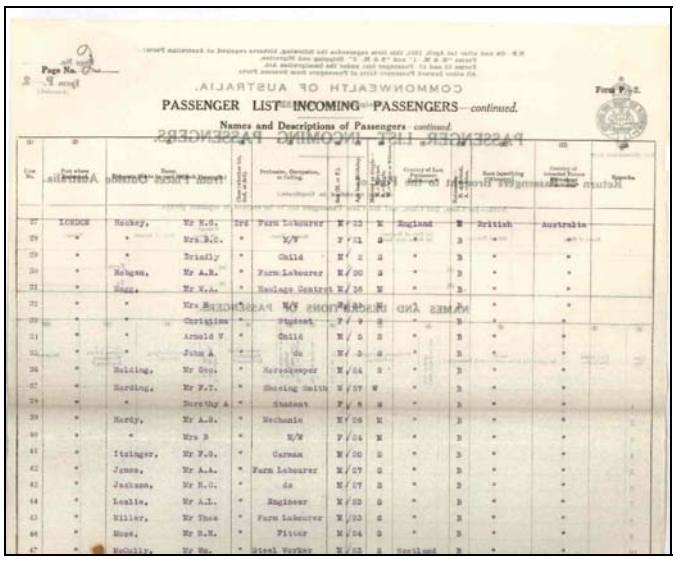


COMMONWEALTH OF AUSTRALIA.

PASSENGER LIST—INCOMING PASSENGERS.

Return of Passengers Brought to the Port of from Places Outside Australia.

NAMES AND DESCRIPTIONS OF PASSENGERS.



PASSENGER LIST—INCOMING PASSENGERS—continued.

Names and Descriptions of Passengers—continued.

You will observe that the resulting new scans are far clearer and the bleed through has disappeared thus enabling any researcher to clearly read the document. Repeat in black and white. Which is clearest?

3. Colour scanning of black and white pages.

A researcher is only interested in the content of the document, not how the paper has deteriorated over time and gone yellow or sepia or gone mouldy or whatever. Scanning a black and white document in colour to record this damage to the paper, and scanning documents that were printed single colour on the brown paper used during the war to save on bleaching costs, is a total waste of effort, and, in many cases, makes the document difficult or impossible to read clearly. It also increases file size and internet transfer times as well as wasting ink when the document is printed, none of which are desirable.

Black and white scans are significantly smaller in size requiring less time for the computer to process the image, less hard drive space for storage, less time to upload to the internet and send to a researcher. All these items reduce costs.

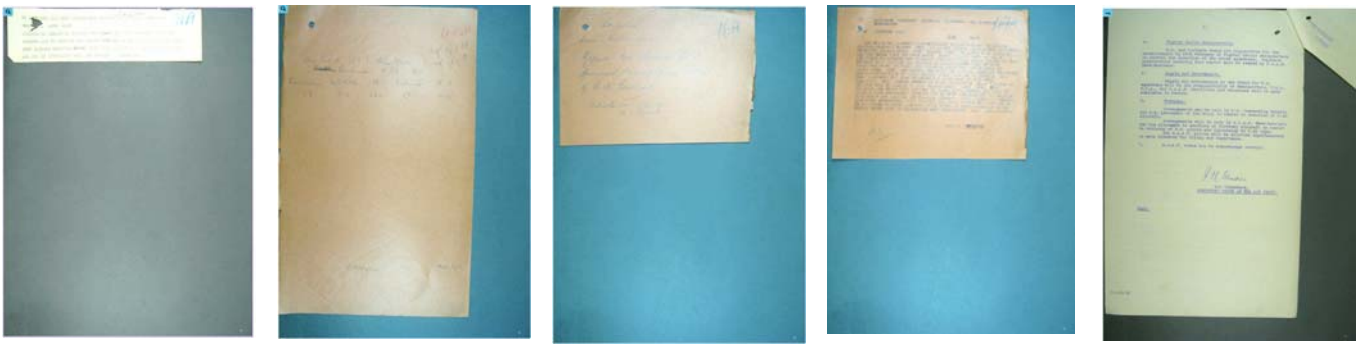
4. Photographing instead of scanning and cropping images

A very significant percentage of archives documents have been photographed instead of scanned.

Done properly that is not a problem but done using the "she'll be right mate" ethos so evident in the majority of the photographed files this can be a total waste of time and resources as shown in photos below.

Properly photographing documents requires correctly positioned diffused lighting of the correct colour spectrum and the page being covered with non reflective glass to ensure that the whole page is flat and in focus.

The pages shown below are prime examples of "she'll be right mate" as obviously no effort has be made to ensure that the lighting is correct and equally no effort has be made to ensure the page is in focus.



One resolution for these problems is covered in topic five.

5. Scanning more than the document (including waste space)

All modern scanners have automatic edge detection.

Looking at the top right example above, the file size if scanned using a modern scanner with size detection would result in a file approximately 15% of the size of the current file. In black and white an even smaller file results. This again reduces the network and storage space and cost.

For the researcher to print any of these pages above there are significant readability benefits and ink (environmental) savings if the document was auto cropped.

With photographing the document the labour cost to manually crop the file would fully offset this but converting the photograph to a PDF file and using Acrobats automatic page cropping option can achieve the same affect at minimal cost. There are also a range of software programs designed to crop the original images prior to conversion to PDF without affecting the original file i.e.: that only crop the output to PDF and keep separate input and output files if required.

I would first recommend that you or a colleague anonymously pose as a researcher so that you can personally see how the process works from the researchers point of view, and spend an hour or more to observe users in the reading rooms copying documents with their cameras or phones. You will observe that the existing facilities lead to a lot of document mishandling just by the very nature of the equipment provided, especially the lighting which has no proper shading and no diffusers to soften the glare as shown in the photo below. This bright light damages the inks and dies and paper as does every finger print. This should not be permitted to continue.

I would also strongly recommend that you interview at least several staff in each "area" of the NAA, front counter staff, scanner operators, camera operators, cataloguers, administrators, storage staff, etc.

Many aviation organisations have staff suggestion systems that reward staff, often with a percentage of the first years savings, for good ideas. The largest payment I know of occurred in the early 70's and went to a United Airlines toilet truck driver who was awarded several million US dollars for his suggestion. The NAA hands on staff could well provide you equally valuable information during an *in camera* one on one interview. The substandard work I have highlighted may in all or part be due to poor morale, poorly designed processes or workflows, lack of proper resources, the use of unsuitable staff, processes with too many redundant requirements (like the researcher being required to provide the requested items full details instead of just the barcode number), or just bad management.

If questioned with a promise of total anonymity, I have no doubt some of the staff would expose what they perceive to be the root causes of the existing problems.

I would strongly recommend you review all the internal and external Audits on the NAA and determine what sort of audits were carried out and which, if any, of the Audit Findings have been actioned and closed.

I strongly suspect that only very basic desktop audits have been carried out. A basic desktop audit purely checks to determine if the policies and procedures of the relevant legislation and regulations are addressed - in other words if they have a set of documents that cover the legal requirements. I am sure that the NAA would pass such an audit with flying colours.

A Full audit goes much further and checks if the procedures actually work in the real world and carries out random checks a small percentage of the output against the policies and procedures to determine if the policies and procedures are actually being complied with by the staff that are required to action them. Given the significant percentage of files I have found that do not meet basic standards I would expect that the NAA has never been subjected to a full audit or has never corrected any identified deficiencies.

All of these failures indicate that the existing quality framework, if such a framework even exists outside of some dusty internal document, must be replaced with an old fashioned Quality Control (QC) regime where every catalogue entry and every document must be assessed by a QC contractor until a consistent 100% compliance is reached. Then, and only then, can the NAA move to a Quality Assurance (QA) programme. In the short term, say two or three years, there must also be a continued QC presence to prevent a rapid backslide. I recommend external QC for this project because they will enforce the standards because the length of the contract is determined by how soon NAA reach compliance. Internal QC would have less incentive and when the QC functions are replaced by QA there would be a number of QC staff positions that would be manned but not in use.

One cost reduction suggestion is that strong consideration be given to using Centrelink *Newstart* persons for researching the errors in the existing cataloguing and simultaneously identifying documents within documents and recording their findings in a simple template table document or spreadsheet file that permanent NAA staff can cut and paste from. Using the existing format shown alongside would be most logical. I would strongly recommend that if this proposal is accepted that the people chosen be aged 55 and over and have basic computer literacy. This age group have far better spelling and vocabulary, and far better grammar than younger people, are much more likely to have an interest in history, and are much better educated in the importance of doing things properly. Training on their specific task(s) would be required but most of the suitable candidates would sail through the induction and training in a day. Some may be a little slower in performing

Item details for: A705, 163/97/176	
Title	CLOSE James Raymond - (Flight Sergeant); Service Number - 26784; File type - Casualty - Repatriation; Aircraft - Wirraway A20-288; Place - Cryon, New South Wales; Date - 28 September 1942
Contents date range	1942 - 1949
Accumulation start date	28 Sep 1942
Series number	A705 Click to see which government agency or person created this item
Control symbol	163/97/176
Citation	NAA: A705, 163/97/176
Item barcode	1056176
Location	Canberra
Access status	Open
Date of decision	17 Dec 1996
Physical format	PAPER FILES AND DOCUMENTS (allocated at series level)
Item notes	**Summary heading** CLOSE James Raymond - (Flight Sergeant); Service Number - 26784 **Descriptive note** In addition to the file subject, the following servicemen are mentioned in this record: WILKINSON Robert Henry – (Flying Officer); Service Number – 408133 A member of the public has provided the following information about this item: The place of death was CRYON, NSW, although .... (More)
Visibility and availability indicators	25. No issue outside the Archives - age related
Alternative series and control symbol	AT2010/4, 163/97/176
Records authority class number	1023677
Date registered	17 Dec 1996

their tasks than younger people or existing staff but the final product would meet all Quality Standards. The *Newstart* persons being "free" labour will have a minimal cost to the NAA. I have no doubt the unions will object but the "she'll be right mate" work that was done by union members does not reflect well on the union and its members. A member of the NAA permanent staff will be required to administer the *Newstart* staff but if those chosen are dedicated, like most front desk staff, they will ensure the program is simple and the output perfect and still complete the majority of their previous tasks.

When using the current researcher photography set-up in the Canberra reading room you hand position the page under bright light and use your camera or phone to take the photo. This is just plain destructive because you need three hands to keep things steady unless your camera has a remote trigger and most cameras and phone do not. As you can see the light "covers" are just light card and just sit on the bars so you cannot even control the position of the covers. The light bulbs used appear to be the cheapest available, instead of ones with the correct light spectrum.

Even the most amateur of home archivists usually has a superior set-up.

I would therefore suggest the trial installation of one flatbed scanner with no Automatic Document Feeder, purely for the scanning of loose leaf publications, and one *Archivist Quill Book Scanner (Complete Kit)*. Both units should be attached to the same stand alone computer to ensure that researchers memory sticks do not introduce any malware. A training video on the use of the book scanners should also be on that computer.

If the *Archivist Quill Book Scanner* is beyond the NAA's budget at US$1700 they could get a Canberra Men's Shed to build a *Archivist Book Scanner* using the free plans and instructions available at http://diybookscanner.org/archivist/ This is a freely available high-quality scanner design that can be created and assembled with tools available at many high school or vocational shop classes or almost any Men's Shed. The design is open and many small institutions have used it to create their own scanners.

A trial of the *Archivist* Book Scanner would need to be in the busiest Sydney or Canberra reading room and there are known issues that need resolving regarding its setup.

These include, but are probably not limited to, the fact that it is designed to be used in a dark room as the easiest way to prevent incidental reflections is to scan in the dark (lit only by the lights of the scanner itself). This is not practical in a reading room so the unit will need a simple blackout tent over it to keep out external light. This is common on commercial book scanners as shown and the T-slot frame of the *Archivist* would make this addition a simple task.

Secondly the *Archivist* is not set to run from a computer, or to automatically mirror the output to a USB drive. This could be done and Pi Scan is an open source project so somebody with experience in Python and Linux could do it. Tenrec would be happy to point them in the right direction. This however is effort that either the NAA or a volunteer group would have to undertake. Pi Scan just outputs the raw photographs and so transferring them to the NAA system and archiving them permanently would require NAA to create a procedure to cover the transfer and storage of the scans.

Thirdly, while Pi Scan is set up to act as a kind of standalone kiosk, it is meant for use by trusted employees or volunteers who will not "tamper" with software settings so there are no security measures to prevent people from tampering with it. In fact, to facilitate use by trusted people there are prominent buttons that allow escape to the console. This software would have to be modified to make a more public user tamper-resistant system or some other software would have to be used to control the cameras. I would suggest that the software be ported to Windows and set up so that the user has to choose between several specific options, for example A4/Letter B&W, A4/letter colour, Folio/Foolscap B&W etc. I have no doubt that an appeal to one of several open source websites would result in high quality software within a short time. You must remember that open source programs like GIMP are often superior in many ways to the commercial equivalent. The first *Shrek* movie was created using GIMP, a task that was way beyond Photoshop's capabilities then and possibly even now.

Paying for a software developer to create a program is possible but as the Queensland Health, Australian Census and hundreds of other Australian state and federal government software projects have shown the results are too often substandard and they always cost many times the contracted price and are never on time. That option should be avoided. Any open source program would be written by a wide group of people who are either interested in the project for their own use or who want to take on the challenge and beat it in the simplest manner. Such software is made by users for users rather than by a company team who often have more interest in their paycheque than the project the company has them working on.

The process to use the *Archivist* book scanner machine is quite simple and researchers would not only welcome the far higher quality output than their phone or camera provides but they would make sure that the document was properly positioned in order to ensure that their personal copy was as near perfect as possible. The output from the book scanner is below archives standards at around 300ppi with the existing cameras but would be adequate for most researchers purposes. More expensive cameras could bring the desired 600ppi resolution now

or in the future. The flatbed scanners should be preset with only two options, 600ppi automatic exposure black and white and the NAA's preferred colour option, both with TIFF output. Users can post process from there at home to suit their personal requirements. That may be as simple as converting to JPG or PDF or may include cropping, deskewing, or even optical character recognition for easy text search on their computer.

The output of both machines could then be provided to the relevant researcher via memory stick and the original scan retained on the computer for checking before including in the archives digital collection. This would require that returned documents be physically checked by either *Newstart* persons or NAA full time staff and post processed using software such as the free ScanTailor or YASW or proprietary software that the NAA already own. Training on those two free programs is minimal using Youtube videos for a person with moderate software skills.

This would eliminate the need to return these researcher scanned documents to the public at any time in the future, with all the risks to the paper from handling, light and fingers, as the digital copy would already be available to all until such time as the NAA had the resources to properly scan the books. No longer needing to transport the file to and from the Reading room is an additional saving.

Another option for book scanners may be overhead scanners such as shown. I have seen many that claim archival quality photos and software that produces perfect page flattening but those I have seen to date fall far short on the claims. The high end unit I tested which made similar claims produced a reasonably flat page but at well below 200dpi so I would not consider it. In a few years, once resolution improves, they will no doubt be ideal for reading rooms but at present they barely compete with a smart phone.

As discussed previously many files have errors in the catalogue and many contain sub files that the NAA currently do not identify, making finding these sub-files almost impossible. I therefore suggest that, by adding a section to the cover page that comes with every NAA PDF file, as shown on the right below, the NAA request researchers to email the NAA or log on to a specific web page and

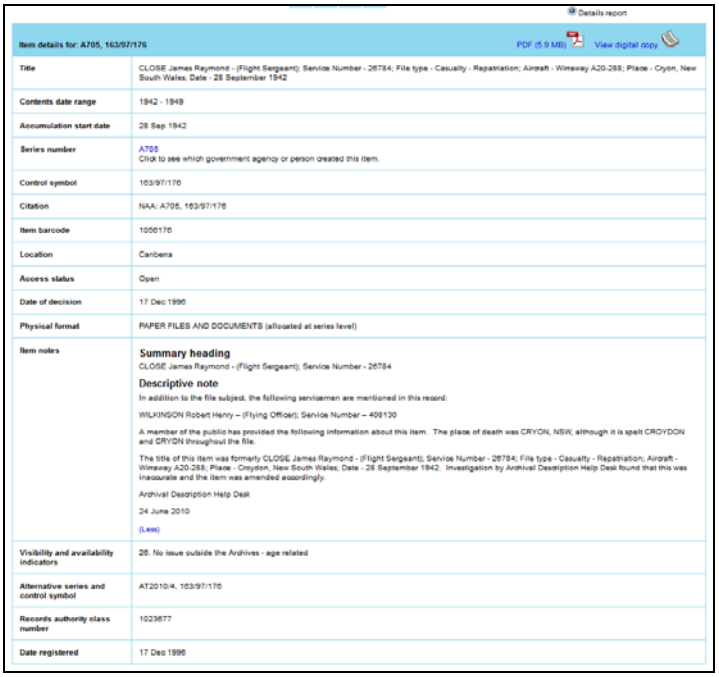
- record any sub-documents found in older files, and
- identify all observed errors in the cataloguing of that document

As you can see there is no shortage of room on the cover page to add this request or to add a list of subdocuments.

Further I suggest that all the information contained in the *Details report* in the catalogue be duplicated in the PDF cover page.

Using the example of barcode 1056176 the *Details report* from the NAA website and the cover page off the PDF file are shown. As you can see the PDF file is missing information that is contained in the *Details report* that most researchers would consider very important and there is more than adequate room on the cover page to provide this information. If a researcher uses the far more user friendly *Summary report* they will never find this missing data. Adding it to the Summary report defeats the purpose of that report.

Likewise there is sufficient space for a list of sub files included in a file on the Details report *Item notes* and on the PDF cover page.

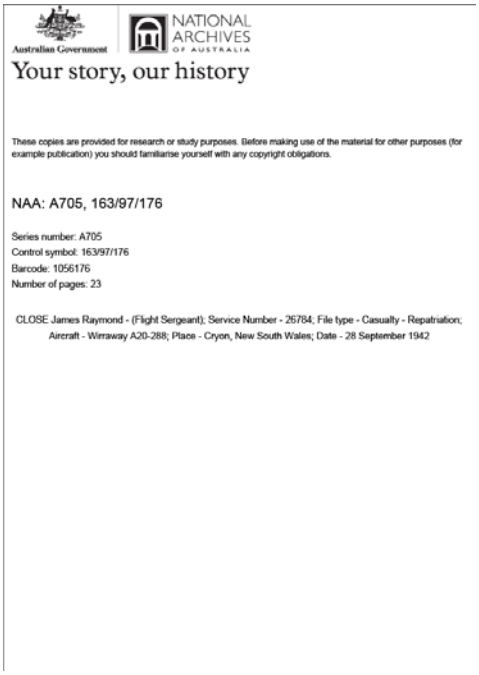


Details report

Item details for: A705, 163/97/176

PDF (5.9 MB) View digital copy

Title	CLOSE James Raymond - (Flight Sergeant); Service Number - 26784; File type - Casualty - Repatriation; Aircraft - Wirraway A20-288; Place - Cryon, New South Wales; Date - 28 September 1942
Contents date range	1942 - 1949
Accumulation start date	28 Sep 1942
Series number	A705 Click to see which government agency or person created this item.
Control symbol	163/97/176
Citation	NAA: A705, 163/97/176
Item barcode	1056176
Location	Canberra
Access status	Open
Date of decision	17 Dec 1996
Physical format	PAPER FILES AND DOCUMENTS (allocated at series level)
Item notes	**Summary heading** CLOSE James Raymond - (Flight Sergeant); Service Number - 26784 **Descriptive note** In addition to the file subject, the following servicemen are mentioned in this record: WILKINSON Robert Henry – (Flying Officer); Service Number – 408130 A member of the public has provided the following information about this item. The place of death was CRYON, NSW, although it is spelt CROYDON and CRYON throughout the file. The title of this item was formerly CLOSE James Raymond - (Flight Sergeant); Service Number - 26784; File type - Casualty - Repatriation; Aircraft - Wirraway A20-288; Place - Croydon, New South Wales; Date - 28 September 1942. Investigation by Archival Description Help Desk found that this was inaccurate and the item was amended accordingly. Archival Description Help Desk 24 June 2010 (Less)
Visibility and availability indicators	20. No issue outside the Archives - age related
Alternative series and control symbol	AT2010/4, 163/97/176
Records authority class number	1023677
Date registered	17 Dec 1996



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Your story, our history

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NAA: A705, 163/97/176

Series number: A705
Control symbol: 163/97/176
Barcode: 1056176
Number of pages: 23

CLOSE James Raymond - (Flight Sergeant); Service Number - 26784; File type - Casualty - Repatriation; Aircraft - Wirraway A20-288; Place - Cryon, New South Wales; Date - 28 September 1942

As discussed on page 5 the RAAF are, then and now, short on transparency.

Hush Still On RAAF Crashes

By a Special Reporter

Despite a ministerial assurance that details of Air Force crashes would be published, the RAAF continues its hush-hush policy.

On October 18, The Herald published a letter from the bereaved parents of an airman who was in a plane which left Milne Bay for Dobodura on September 11, and went into the sea. They said they had seen no reports about the 21 persons missing.

Actually this was the first public mention of the crash, and RAAF Headquarters explained that details of operational crashes were not released for publication.

On October 20 the Minister for Air (Mr Drakeford) issued a statement that he had agreed to the publication of details of RAAF crashes, whether in operational or non-operational areas, provided that next-of-kin had been notified. The public, he said, had a right to know about them.

The same day it was stated officially that a report of the crash was being supplied to the Minister for his consideration.

MINISTER SILENT

However, Mr Drakeford has still not issued a statement on this crash and RAAF Headquarters is still maintaining secrecy in defiance of its Minister's assurances.

Following Mr Drakeford's denial of any hush-hush tactics by the Air Force, The Herald, on October 22, asked the RAAF directorate of Public Relations to issue a statement showing the number of undisclosed crashes since V-P Day and the number of casualties.

This information has not yet been supplied, although it has not been refused. Each day for three weeks—the information has been asked for and daily the reply has been the same—"It is not ready yet."

From the (Melbourne) "Herald" 12th NOV 1945.

R.S.L. MOVE ON AIR CRASHES

Vital Instruments Removed

SYDNEY, Sunday.—At least 15 members of the R.A.A.F. had been killed since V.P. Day while ferrying planes back to Australia from the islands, the State Secretary of the Returned Soldiers' League (Mr. J. R. Lewis) said to-night.

Mr. Lewis based the figure on a report now being prepared by him for submission to the league executive.

He added that allegations had been made that vital instruments had been removed from the aircraft before they were flown back to their home bases.

The league was investigating the matter, and action could be expected soon.

"Safety Disregarded"

The Federal President of the Australian Legion of Ex-Servicemen and Women (Mr. R. J. McDonald) said he was astonished at the authorities' apparent lack of regard for the safety of men.

"Obviously," he said, "the authorities have come to regard the airmen in much the same light as they do the planes—now that the war is over there is not further use for them."

From "The Age" 24th DEC 1945.

There are a number of people researching WW2 RAAF history, and in particular some of the above events, who are hampered by the fact that so many WW2 RAAF files are still closed 74 plus years on, despite the 20-30 years general limits for file closure.

Most or all files relating to the events in those newspaper articles are still closed and there is no reason that most people can see why this should be so unless the RAAF are continuing to cover up some long past actions that they believe may still reflect badly on the RAAF. Certainly nothing would have foreign political ramifications and the statute of limitations for action against any persons involved in any such incident would be long past even if those people still lived, which is unlikely.

In the UK and USA almost everything short of how to make an atomic bomb is now open access so it is unlikely these files are closed because of some agreement with Australia's allies that Australia was not to release certain documents.

Some RAAF files that are closed or were destroyed in Australia are open and available in the USA.

It therefore appears that some RAAF persons have perceived that the RAAF's sensitivities take precedence over the needs of the families of those deceased some 74 plus years ago, and of those trying to write an accurate history on any subject that is even tangentially connected to these files.

Maybe it is just plain obstructionism.

Or it is another derivative of that most famous of contradictions in terms, military intelligence.

Furthermore a review of *Why we refuse access – Fact sheet 46* shows no reason these files should not be released in full.

I repeat the AHA suggestion for the creation of *an advisory council independent from the Archives which has the job of managing the task of assessing which records should be made available to researchers. The UK example is worth citing here where the* Advisory Council on National Records and Archives *is independent of the National Archives and 'represents the public interest in deciding what records should be open or closed' (http://www.nationalarchives.gov.uk/about/our-role/advisory-council/). It is telling that 'The Advisory Council regularly challenges government departments to provide evidence to justify requests for permission to retain documents or for them to remain closed'. This model is well worth considering.*

If heads were to "roll" from the NAA it should not be the junior staff but the senior persons who allowed this situation to develop and grow for a number of years, starting with the whole "quality management" team, if there even is one, and those senior staff that took no action on any audit reports. Under normal quality practices the QA/QC team report direct to the Director-General so he should be replaced.

The NAA web site says

> **Leadership team**
>
> The Director-General and executive provide leadership to the organisation. Each member of the leadership team has responsibility for one of the Archives branches which work together to meet the organisation's goals.

It is significant that under the each heading shown left on web page http://www.naa.gov.au/about-us/organisation/index.aspx there is not one mention of Quality Management. That should mean that every person on the *Leadership team* and on the *Accountability and reporting team* is jointly responsible. Obviously each and every member of both teams believe someone else is responsible and/or the have collectively decided to operate quality free in the belief that **"She'll be right mate."**

If it was honest, at present the above clip should be revised to read *The Director-General and executive* ***are supposed*** *to provide leadership to the organisation. Each member of the leadership team has responsibility for one of the Archives branches which work together to meet the organisation's goals.* ***No one is responsible for ensuring the NAA has or meets any Quality standards.***

Obviously the Director-General has never done his own independent checks of his staffs performance and nor have the Access and Public Engagement Director, or the Director of Collection Management, because they would have to be wilfully blind to have never detected these problems.

The same can be said of the Advisory Council.

Tune Review Attachment 1-1

Samples comparing a NAA digested page with the same page scanned in black and white on a cheap domestic printer/scanner five years ago.

ENCLOSURE 2A.

FOR OFFICIAL USE ONLY

AIR FORCE HEAD-QUARTERS

TECHNICAL ORDER

AIRSCREW INSTRUCTION NO.43
APPLICABLE : 2D40 airscrews.

2D40 AIRSCREWS - WIRRAWAY AIRCRAFT

1. The 2D40 airscrew fitted to Wirraway aircraft are to be withdrawn from service and are to be replaced with the standard 3D40 airscrew. When making this change, reference is to be made to Wasp Instruction No.20; that instruction is to be carried out as soon as possible.

Supply.

2. The following item is required:

Item No.	Ident No.	Part No.	Description	No. off	Class
1	T25A/25209	3D40-ADH2	Hydro - controllable airscrew	1	A

Units with Wirraway aircraft fitted with 2D40 airscrews are to demand on No.2 Stores Depot for the above type airscrews.

3. The following item is to be returned to No.2 Stores Depot as serviceable.

Item No.	Ident No.	Part No.	Description	No. off	Class
1	T25A/503	2D40-ADH3	Hydro - controllable airscrew	1	A

If the above type airscrew has only been in service 100 hours since the last complete overhaul, it is to be returned to No.2 Stores Depot as serviceable; if in service over 100 hours since the last complete overhaul, it is to be overhauled before being returned to No.2 Stores Depot.

Reference: File R.A.A.F. 150/4/3550.

Date of Issue: 24th December, 1942.

Restricted

AIR FORCE HEAD-QUARTERS
TECHNICAL ORDER

AIRSCREW INSTRUCTION No. 43
Applicable: 2D40 airscrews.

2D40 AIRSCREWS — WIRRAWAY AIRCRAFT

1. The 2D40 airscrew fitted to Wirraway aircraft are to be withdrawn from service and are to be replaced with the standard 3D40 airscrew. When making this change, reference is to be made to Wasp Instruction No. 20.

Supply

2. The following item is required:—

Item No.	Ident. No.	Part No.	Description	No. Off	Class
1	T25A/5027	3D40-ADH2	Hydro — controllable airscrew	1	A

Units with Wirraway aircraft fitted with 2D40 airscrews are to demand on No. 2 Stores Depot for the above type airscrews.

3. The following item is to be returned to No. 2 Stores Depot as serviceable.

Item No.	Ident. No.	Part No.	Description	No. Off	Class
1	T25A/5033	2D40-ADH3	Hydro — controllable airscrew	1	A

If the above type airscrew has only been in service 100 hours since the last complete overhaul, it is to be returned to No. 2 Stores Depot as serviceable; if in service over 100 hours since the last complete overhaul, it is to be overhauled before being returned to No. 2 Stores Depot.

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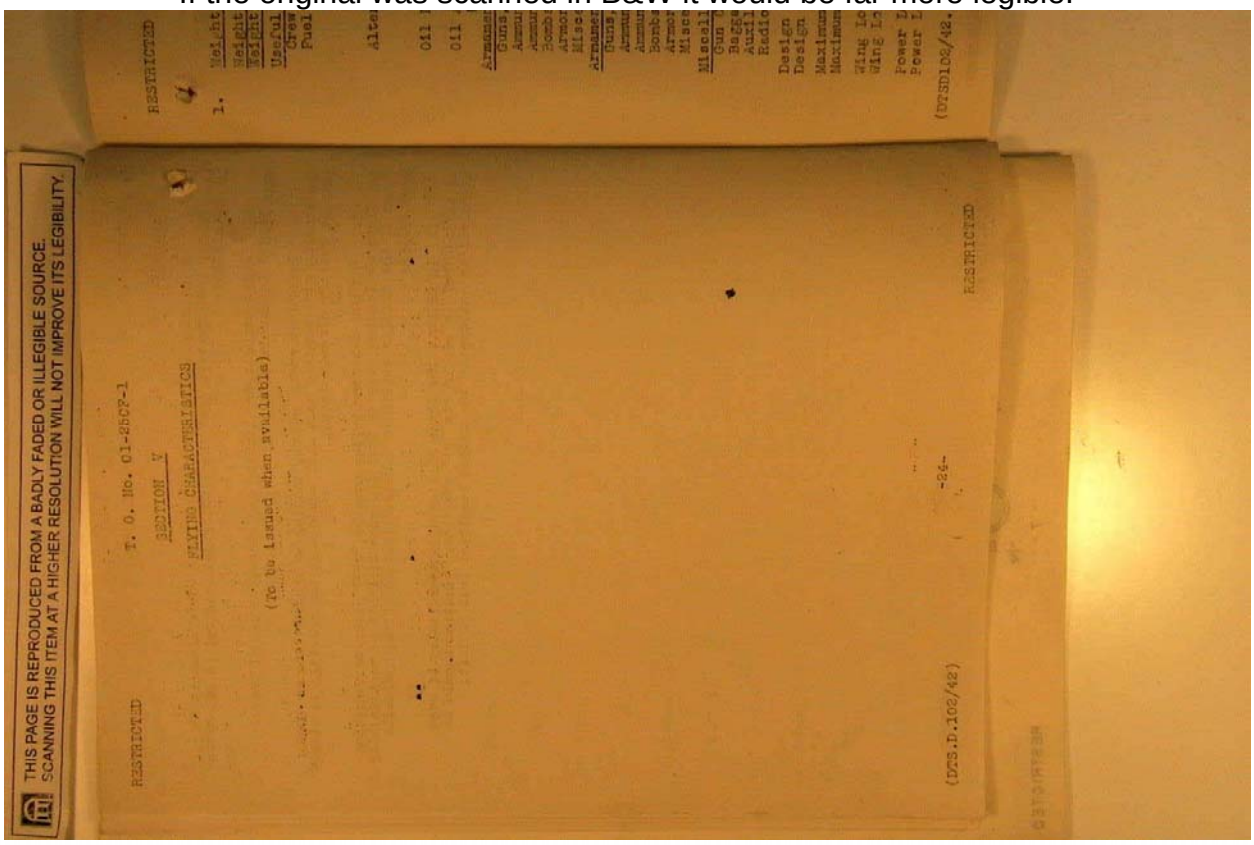
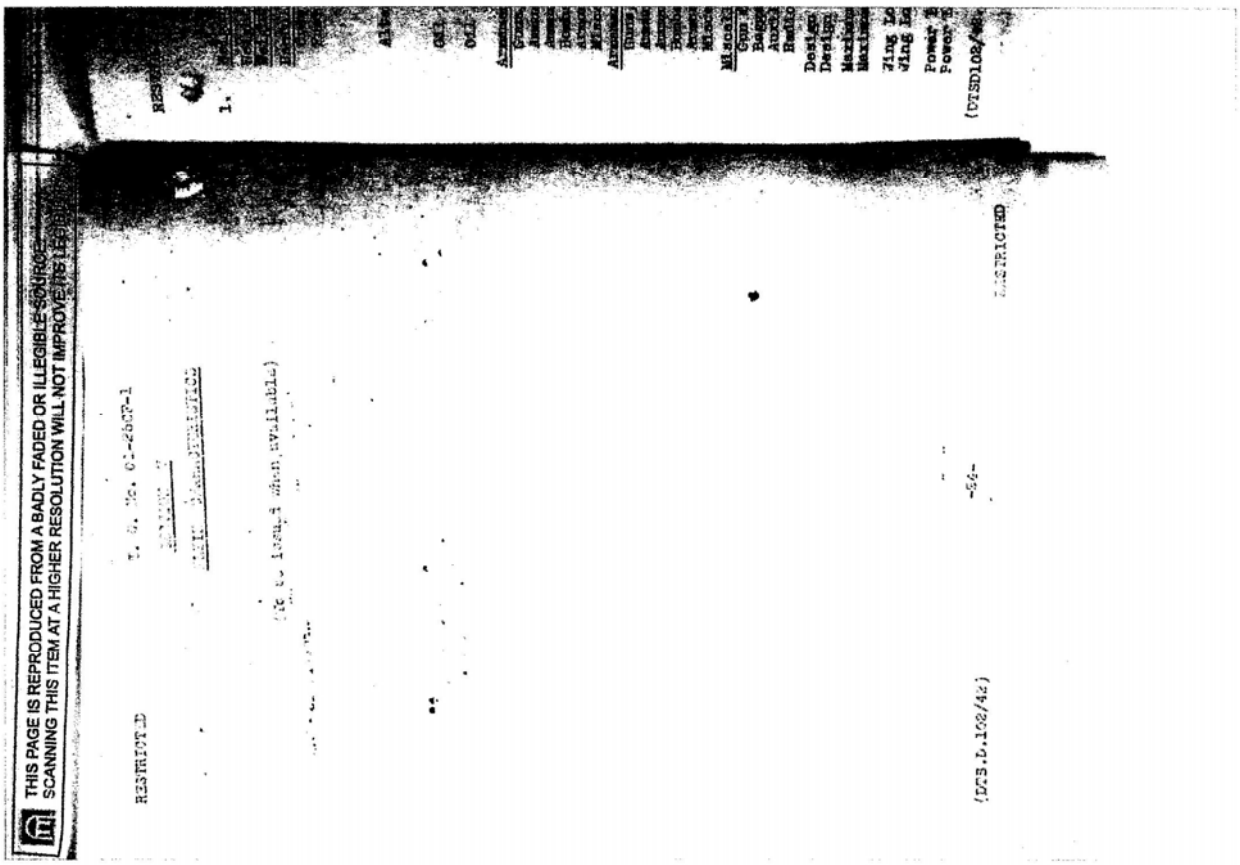
Reference: File R.A.A.F. 150/4/3550.
Date of Issue: 24th December, 1942.
Reprinted: April, 1945.

Tune Review Attachment 1-2

Samples comparing a NAA digested page with the same page printed and then scanned in black and white on a cheap domestic printer/scanner.

Printed out the B&W is far more legible than the NAA file.
If the original was scanned in B&W it would be far more legible.





Tune Review Attachment 3-1

Examples of Wirraway, Beaufort And Kittyhawk catalogue errors

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search results per page | Displaying 1 to 200 of 1162 | List report | Details report

Select	Series no.	Control symbol	Item title	Date range	Digitised item	Item barcode	Format
A705	32/16/1729		Accident to Wirraway A20-727 - Unit No 22 Sqn - Place 1000 yds with Richmond Airfield - Pilot Flt/Lt L J Hoare (033138) A211038 and Cadet Pearson, J A - Date **8 October 1955** Access status: Open Location: Canberra	1800 - 1800		165806	
MP287/1	113	8	Aircraft - Wirraway and Wackett Trainer Production Schedule of deliveries **up to June 1942** Access status: Open Location: Melbourne	1800 - 1800		364252	
MP450/1	18		W-2 Wirraway contracts Access status: Open Location: Melbourne	1800 - 1800		458347	
C521 1	115	6165	Dredger, Wirraway, Aircraft - Primary Version Access status: Not yet examined Location: Various locations	1896 - 1983		13243997	Audio-visual records
C521 1	115	6166	Dredger, Wirraway, Aircraft - Camera Material Access status: Not yet examined Location: Various locations	1896 - 1983		13243998	Audio-visual records
J1889	BL	20751	Vinnicombe, M - Claim for compensation re Wirraway accident at Maroochydore on **30 December 1950** Access status: Open Location: Brisbane	1903 - 1985		13026856	
J1889	BL	20752	Shanks, Enid - Claim for compensation re Wirraway accident at Maroochydore on **30 December 1950** Access status: Open Location: Brisbane	1903 - 1985		13026857	
J1889	BL	20753	Blair, S - Claim for compensation re Wirraway accident at Maroochydore on **30 December 1950** Access status: Open Location: Brisbane	1903 - 1985		13026858	
J1889	BL	20794	Blair, S - Claim for compensation re Wirraway accident at Maroochydore on 30 December 1950 Access status: Open Location: Brisbane	1903 - 1985		13026859	

J1889	BL20795	Probert, D A - Claim for compensation re Wirraway accident at Maroochydore on 30 December 1950 Access status: Open Location: Brisbane	1903 - 1985		13026860
J1889	BL20796	Probert, N I - Claim for compensation re Wirraway accident at Maroochydore on 30 December 1950 Access status: Open Location: Brisbane	1903 - 1985		13026861
A705	166/31/376	O'RORKE, Hugh - (Leading Aircraftman); Service Number - 449012; File type - Casualty - Repatriation; Aircraft - Wirraway A20-7; Place - 6 miles west of the Rock, NSW; Date - 12 June 1945 Access status: Open Location: Canberra	1922 - 1960		60204381
A705	32/16/1528	Accident re : Wirraway A20-745 Place: Naghama (Shikoku) Access status: Open Location: Canberra	1929 - 1960		1130478
A705	32/16/1699	Accident re : Wirraway A20-729 Place: Uranquinty Pilot: PNA (P) Brown-Greaves PE A50120 Access status: Open Location: Canberra	1929 - 1960		1130480
A705	32/16/1701	Accident re : Wirraway A20-668 Place: Point Cook Aerodrome Pilot: Flt Lt LR Klaffer (04218) Access status: Open Location: Canberra	1929 - 1960		1130483
A705	32/16/1743	Accident re : Wirraway A20-468 Place: Uranquinty Airfield Pilot: Flt Lt AJ Fookes (033200) Access status: Open Location: Canberra	1929 - 1960		1130486
A705	32/16/1746	Accident re : Wirraway A20-438 Place: Richmond Pilot: Flt Lt RJ McKimm (022084) Access status: Open Location: XNAA	1929 - 1960		1130489
A705	32/16/1789	Incident re : Wirraway A20-715 Place: Point Cook Pilot: T/Plt PG Compton A217784 Access status: Open Location: Canberra	1929 - 1960		1130492
A705	32/16/1790	Incident re : Wirraway A20-690 Place: East Sale Pilot: N/a Access status: Open Location: Canberra	1929 - 1960		1130494
A705	32/16/1791	Accident re: Wirraway A20-29 Place: Point Cook Pilot: Lieut CA Dakin (0274) RAN Access status: Open Location: Canberra	1929 - 1960		1130500
A705	32/16/1792	Accident re: Wirraway A20-719 Place: Point Cook Pilot: A313263 Tr Plt RJ Bomball Access status: Open Location: Canberra	1929 - 1960		1130501
A705	32/16/1793	Accident re: Wirraway A20-668 Place: Point Cook Pilot: A6782 S/Air Cadet White GK Access status: Open Location: Canberra	1929 - 1960		1130503

A7 05	32/ 16/ 179 4	Accident re: Wirraway A20-234 Place: East Sale Pilot: Plt Off GS Hale (035096) Access status: Open Location: Canberra	1929 - 1960	1130505
A7 05	32/ 16/ 180 0	Accident re: Wirraway A20-739 Place: 3 Miles North of Geelong Pilot: A214552 Tr Plt Shepherd WJ Access status: Open Location: Canberra	1929 - 1960	1130506
A7 05	32/ 16/ 180 3	Accident re: Wirraway A20-609 Place: Malla Pilot: Flt Lt BFS Nichollis (022103) Flt Lt DS Forbes (042994) Access status: Open Location: XNAA	1929 - 1960	1130507
A7 05	32/ 16/ 180 8	Accident re: Wirraway A20-562 Place: Point Cook Pilot: Flf Off CT Killian (052721) Access status: Open Location: Canberra	1929 - 1960	1130511
A7 05	32/ 16/ 181 7	Accident re: Wirraway A20-371 Place: Point Cook Pilot: A214552 Trainee pilot Shepherd W J Access status: Open Location: Canberra	1929 - 1960	1130513
A7 05	32/ 16/ 182 5	Accident re: Wirraway A20-725 Place: Richmond Pilot: A220295 Cdt Off R D Judd Access status: Open Location: Canberra	1929 - 1960	1130525
A7 05	32/ 16/ 182 7	Accident re: Wirraway A20-682 Place: Point Cook Pilot: Flt Lt GC Monkley (0216043) Access status: Open Location: Canberra	1929 - 1960	1130529
A7 05	32/ 16/ 183 0	Accident re: Wirraway A20-267 Place: Pearce Pilot: Sqn Ldr CJ Sugden (05813) Access status: Open Location: Canberra	1929 - 1960	1130532
A7 05	32/ 16/ 183 2	Accident re: Wirraway A20-704 Place: Mallala Pilot: A218504 Sgt Hincenbergs A Access status: Open Location: Canberra	1929 - 1960	1130536
A7 05	32/ 16/ 206 0	Accident re: Wirraway A20-724 Place: Point Cook Access status: Open Location: Canberra	1929 - 1960	1130540
A7 05	53/ 1/8 67	UNSWORTH, James Frederick - (Flying Officer); Service Number - 763; File type - Casualty - Repatriation; Aircraft - Wirraway A20-155; Place - Darra; **Date - 31 January 1941** Access status: Open Location: Canberra	1929 - 1945	1054273
A7 05	163 /28/ 132	DINEEN, Arthur Kenneth - (Flying Officer); Service Number - 400972; File type - Casualty - Repatriation; Aircraft - Wirraway A20-51; Place - Buna, Papua New Guinea; Date - 18 June 1942 Access status: Open Location: Canberra	1929 - 1960	1054548

A7 05	163 /33/ 76	GALTON Stanley Wallace - (Flight Lieutenant); Service Number - 437; File type - Casualty - Repatriation; Aircraft - Wirraway A20-521; Place - Norah Head, New South Wales; Date - 18 November 1942 Access status: Open Location: Canberra	1929 - 1960		1054804
A7 05	163 /42/ 60	LENNE Hubert Albert - (Pilot Officer); Service Number - unknown; File type - Casualty - Repatriation; Aircraft - Wirraway A20-53; Place - MacKay Hospital, Queensland; Date - 19 December 1940 Access status: Open Location: Canberra	1929 - 1960		1055145
A7 05	163 /44/ 186	MARR William Allen - (Flight Lieutenant); Service Number - 399; File type - Casualty - Repatriation; Aircraft - Wirraway A20-477; Place - Berry, New South Wales; Date - 17 December 1942 Access status: Open Location: Canberra	1929 - 1960		1055248
A7 05	163 /52/ 66	PROWD Stanley Norman - (Flying Officer); Service Number - 678; File type - Casualty - Repatriation; Aircraft - Wirraway A20-77; Place - Wagga Aerodrome; Date - 3 August 1941 Access status: Open Location: Canberra	1929 - 1960		1055407
A7 05	163 /64/ 96	WOODHILL Alan Murchison - (Flight Lieutenant); Service Number - unknown; File type - Casualty - Repatriation; Aircraft - Wirraway A20-220; Place - Molebo, near Wagga Wagga, New South Wales; Date - 20 June 1941 Access status: Open Location: Canberra	1929 - 1960		1055638
A7 05	163 /87/ 230	ANDREW-STREET Alfred Gordon - (Sergeant); Service Number - 18069; File type - Casualty - Repatriation; Aircraft - Wirraway A20/427; Place - Uranquinty, New South Wales; Date - 11 July 1942 Access status: Open Location: Canberra	1929 - 1960		1055757
A7 05	163 /92/ 209	BINGEMANN Frederick - (Leading Aircraftman); Service Number - 420119; File type - Casualty - Repatriation; Aircraft - Wirraway A20-567; Place - Uranquinty, New South Wales; Date - 30 October 1942 Access status: Open Location: Canberra	1929 - 1960		1054904
A7 05	163 /11 6/3 8	GERMAIN Cecil - (Leading Aircraftman); Service Number - 414373; File type - Committee of Adjustment; Aircraft - Wirraway A20-221; Place - 15 miles east of Deniliquin, New South Wales; Date - 20 July 1942 Access status: Open Location: Canberra	1929 - 1960		1057080

A705	163/120/486	HARPER Cyril Tristram Joseph (Leading Aircraftman); Service Number - 416959; File type - Casualty - Repatriation; Aircraft - Wirraway A20-559; Place - Mulwala Canal, New South Wales; Date - 25 June 1942 Access status: Open Location: Canberra	1929 - 1960	1057508
A705	163/123/261	HODGES Arthur George - (Flight Sergeant); Service Number - 5825; File type - Casualty - Repatriation; Aircraft - Wirraway A20-494; Place - MacKay, Queensland; Date - 4 June 1942 Access status: Open Location: Canberra	1929 - 1960	1057826
A705	163/141/507	MCCLYMONT Archibald Murray - (Aircraftman); Service Number - 414066; File type - Casualty - Repatriation; Aircraft - Wirraway A20-79; Place - Uranquinty, New South Wales; Date - 7 April 1942 Access status: Open Location: Canberra	1929 - 1960	1058666
A705	163/141/583	MCDONALD Enoch George - (Aircraftman 1); Service Number - 45173; File type - Casualty - Repatriation; Aircraft - Wirraway A20-127; Place - Pearcw, Western Australia; Date - 11 June 1942 Access status: Open Location: Canberra	1929 - 1960	1058652
A705	163/145/195	MONFRIES James Baker - (Leading Aircraftman); Service Number - 26790; File type - Committee of Adjustment; Aircraft - Wirraway A20-445; Place - Uranquinty, New South Wales; Date - 21 January 1942 Access status: Open Location: Canberra	1929 - 1960	1059014
A705	163/160/98	SCOTT Kenneth Ian - (Corporal); Service Number - 6591; File type - Proceedings of Committee of Adjustment; Aircraft - Wirraway A20/117; Place - Ravenswood, Queensland; Date - 18 April 1941 Access status: Open Location: Canberra	1929 - 1960	1059853
A705	163/162/232	SMITH Harry Stancliff - (Leading Aircraftman); Service Number - 411717; File type - Casualty - Repatriation; Aircraft - Wirraway A20-374; Place - Deniliquin Aerodrome, New South Wales; Date - 20 November 1941 Access status: Open Location: Canberra	1929 - 1960	1059736
A705	163/163/629	SPARROW Wilfred Frank - (Leading Aircraftman); Service Number - 421092; File type - Casualty - Repatriation; Aircraft - Wirraway A20-490; Place - Uranquinty, New South Wales; Date - 14 December 1942 Access status: Open Location: Canberra	1929 - 1960	1060160

☐	A7 05	163 /17 5/3 6	VEITCH Donald Andrew - (Leading Aircraftman); Service Number - 404316; File type - Casualty - Repatriation; Aircraft - Wirraway A20-163; Place - Goodna, Queensland; Date - 18 January 1941 Access status: Open Location: Canberra	1929 - 1960	1060648
☐	A7 05	163 /17 6/3 20	WALLACE Roy Neil - (Leading Aircraftman); Service Number - 409639; File type - Casualty - Repatriation; Aircraft - Wirraway A20-610; Place - Big Springs, New South Wales; Date - 31 July 1942 Access status: Open Location: Canberra	1929 - 1960	1060433
☐	A7 05	166 /8/1 465	CODD, James Dargin - (Sergeant); Service Number - A33623; File type - Casualty - Repatriation; Aircraft - Wirraway A20-745; Place - Nagahma Shikokn, Japan; Date - 16 June 1952 Access status: Open Location: Canberra	1929 - 1960	1066150
☐	A7 05	166 /9/8 74	DILLON, Edward Francis - (Warrant Officer); Service Number - A52716; File type - Casualty - Repatriation; Aircraft - Wirraway A20-679; Place - Werribee, Victoria; Date - 1 April 1958 Access status: Open Location: Canberra	1929 - 1960	1067101
☐	A7 05	166 /13/ 607	FITZSUMMONS, Terrence Darrell - (Flight Lieutenant); Service Number - 02357; File type - Casualty - Repatriation; Aircraft - Wirraway A20-512; Place - Point Cook, Victoria; Date - 15 August 1952 Access status: Open Location: Canberra	1929 - 1960	1068228
☐	A7 05	166 /17/ 40	HARBER, Raymond Stanley - (Flight Sergeant); Service Number - 32803; File type - Casualty - Repatriation; Aircraft - Wirraway A20-449; Place - Rathdowney, Queensland; Date - 14 February 1943 Access status: Open Location: Canberra	1929 - 1960	1069521
☐	A7 05	166 /17/ 51	HAVEN, Bryan Worsley - (Corporal); Service Number - 36983; File type - Casualty - Repatriation; Aircraft - Wirraway A20-523; Place - Munmorah, New South Wales; Date - 24 February 1943 Access status: Open Location: Canberra	1929 - 1960	1069524
☐	A7 05	166 /17/ 734	HAWDON, Charles Milton - (Sergeant); Service Number - 439761; File type - Casualty - Repatriation; Aircraft - Wirraway A20-469; Place - Narromine, New South Wales; Date - 5 September 1944 Access status: Open Location: Canberra	1929 - 1960	1069930
☐	A7 05	166 /17/ 162 8	HARRISON, Geoffrey Desmond Grant - Service Number - 450915; File type - Casualty - Repatriation; Aircraft - Wirraway A20-614; Place - Geelong, Victoria; Date - 8 May 1950 Access status: Open Location: Canberra	1929 - 1960	1070197

A7 05	166 /21/ 428	JOHNSTONE Ronald Keith - (Flight Sergeant); Service Number - 033214; File type - Casualty - Repatriation; Aircraft - Wirraway A20-724; Place - at sea vicinity of Point Cook, Victoria; Date - 28 March 1951 Access status: Open Location: Canberra	1929 - 1960		1071290
A7 05	166 /24/ 211	LAWRIE, Stanley Thomas - (Leading Aircraftman); Service Number - 428614; File type - Casualty - Repatriation; Aircraft - Wirraway A20/594; Place - Deniliquin, New South Wales; Date - 29 October 1943 Access status: Open Location: Canberra	1929 - 1960		1072066
A7 05	166 /27/ 260	MILLIKEN, Ewen Douglas - (Pilot Officer); Service Number - 430216; File type - Casualty - Repatriation; Aircraft - Wirraway A20-363; Place - Deniliquin, New South Wales; Date - 1 November 1943 Access status: Open Location: Canberra	1929 - 1960		1073767
A7 05	166 /29/ 334	NEILL, Geoffrey Meyer - (Seergeant); Service Number - A118; File type - Casualty - Repatriation; Aircraft - Wirraway A20-212; Place - Maroochydore Beach, Queensland; Date - 30 December 1950 Access status: Open Location: Canberra	1929 - 1960		1074895
A7 05	166 /32/ 4	PARANTHOIENE, Francis Alexander - (Leading Aircraftman); Service Number - 423310; File type - Casualty - Repatriation; Aircraft - Wirraway A20-241; Place - Coolamon Road Satellite; Date - 5 January 1943 Access status: Open Location: Canberra	1929 - 1960		1075561
A7 05	166 /33/ 494	PRITCHARD, Alex Gordon - (Pilot Officer); Service Number - 041034; File type - Casualty - Repatriation; Aircraft - Wirraway A70-720; Place - East Sale, Vic; Date - 13 July 1954 Access status: Open Location: Canberra	1929 - 1960		1077493
A7 05	166 /34/ 19	QUINN, George Frederick - (Warrant Officer); Service Number - 416999; File type - Casualty - Repatriation; Aircraft - Wirraway A20-634; Place - Port Augusta, South Australia; Date - 27 May 1944 Access status: Open Location: Canberra	1929 - 1960		1077613
A7 05	166 /38/ 245	STARMER, Sydney Hogarth - (Leading Aircraftman); Service Number - 429460; File type - Casualty - Repatriation; Aircraft - Wirraway A20-569; Place - Collingullie Bombing and Gunnery Range, NSW; Date - 19 August 1943 Access status: Open Location: Canberra	1929 - 1960		1078599

A705	166/39/32	THUELL Edward Albert - (Sergeant); Service Number - 413285; File type - Casualty - Repatriation; Aircraft - Wirraway A20-93; Place - near Williamtown Aerodrome; Date - 3 March 1943 Access status: Open Location: Canberra	1929 - 1960		1081531
A705	166/43/1885	WALTERS, Ian Keith - (Sergeant); Service Number - A25480; File type - Casualty - Repatriation; Aircraft - Wirraway A20 713; Place - Williamtown, NSW; Date - 16 July 1953 Access status: Open Location: Canberra	1929 - 1960		1083351
A10297	ROLL 5	Aircraft status cards - BLOCK 104: Empire Flying Boat A18-10 - A18-14 to BLOCK 107: Wirraway A20-1 - A20-499 Access status: Open Location: Canberra	1930 - 1988		11448044
A10297	ROLL 6	Aircraft status cards - BLOCK 108: Wirraway A20-500 - A20-757 to BLOCK 140: Fairey Battle R7377, R7380, R7385 Access status: Open Location: Canberra	1930 - 1988		12014855
MP1117/1	2076	Proposed bomb circuits - Wirraway Access status: Open Location: Melbourne	circa 1932 - circa 1965		10354274
MP1117/1	A7282	Wirraway Station Drawing [diagram of plane approximately A4 size] Access status: Open Location: Melbourne	1932 - 1965		12203235

Note in the above date ranges most start 1929 and most end 1960, It is unlikely all these pilots were all born in 1929 and the Maroochydore accident claims files most definitely originated as a result of the 30 Dec 1959 so obviously that is the Terminus post quem for that set of files.

My guess is these Maroochydore files were not opened until 1950 at the earliest - certainly not 1903 as claimed by the NAA.

Obviously either there was no Quality Control (QC) of any sort in place when these files were digitized or ."she'll be right mate" outranked QC

Note that some of these files are from Brisbane and Melbourne which shows that the "she'll be right mate" dating is not limited to Canberra.

search results per page

Displaying **1 to 200 of 2899**

List report

Details report

Select	Series no.	Control symbol	Item title	Date range	Digitised Item barcode	Format
	MP450/1	52	manufacture of Beaufort Aircraft Taurus engines in Australia Access status: Open Location: Melbourne	1800 - 1800	458326	
	MP450/1	82	Beaufort Torpedo Bomber Production in Australia 1943 Access status: Open Location: Melbourne	1800 - 1800	458291	
	MP450/1	164	RAAF contract-specification No. for Beaufort Aircraft Access status: Open Location: Melbourne	1800 - 1800	458085	

Note these files are from Melbourne which shows that the "she'll be right dating is not limited to Canberra.

The earliest possible dates for these files are 1938

search results per page | Displaying 1 to 200 of 599 | List report | Details report

Select	Series no.	Control symbol	Item title	Date range	Digitised item	Item barcode	Format
☐	A10297	ROLL 8	Aircraft status cards - BLOCK 211: Boston Bomber A28-4 - A28-40, A28-50 - A28-78 to BLOCK 225: Kittyhawk C3-500 - C3-566 Access status: Open Location: Canberra	1930 - 1988		11399607	

None of the above aircraft existed in 1930 and I doubt that file was revised in 1988

Select	Series no.	Control symbol	Item title	Date range	Digitised item	Item barcode	Format
☐	A705	9/42/40	DTS [Directorate Technical Services] - "Kittyhawk" radiator defects Access status: Open Location: Canberra	1939 - 1942		164531	

The file itself says it was opened 17/6/42, NAA say 1939

Select	Series no.	Control symbol	Item title	Date range	Digitised item	Item barcode	Format
☐	A9845	3	Kittyhawk A29 [AccidentsPart 1] {Note: for table of accidents see item note} Access status: Open Location: Canberra	1939 - 1945		7127141	

The file shows the first 3 accidents were 8/3/42, NAA say 1939

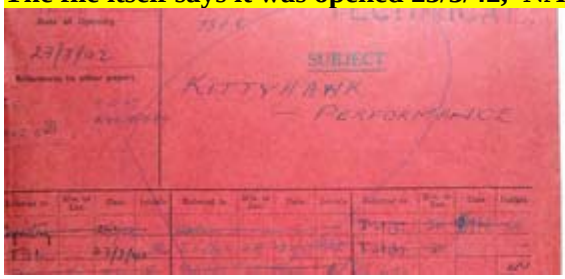
An early page in the file says date range 1941/42 so that would be acceptable given that is what the file says even though it is still not accurate

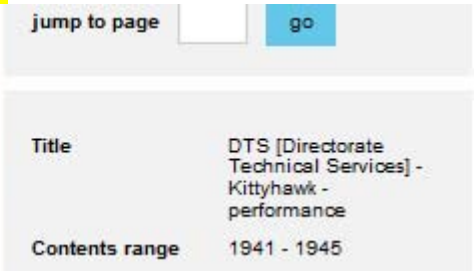
Select	Series no.	Control symbol	Item title	Date range	Digitised item	Item barcode	Format
☐	A9845	4	Kittyhawk A29 [Accidents Part 2] {Note: for table of accidents see item note} Access status: Open Location: Canberra	1939 - 1945		7127142	

Later than Part 1 above

Select	Series no.	Control symbol	Item title	Date range	Digitised item	Item barcode	Format
☐	A705	9/42/9	DTS [Directorate Technical Services] - Kittyhawk - performance Access status: Open Location: Canberra	1941 - 1945		164527	

The file itself says it was opened 23/3/42, NAA say 1941





☐	A705	163/34/140	GIDDY Peter Radcliffe - (Flying Officer); Service Number - 715; File type - Casualty - Repatriation; Aircraft - Kittyhawk AK 830; Place - Middle East; Date - 12 March 1942 Access status: Open Location: Canberra	1941 - 1947		1054837

Note the difference in the highlighted dates

☐	A705	163/124/87	HUNTER William John - (Flying Officer); Service Number - 404908; File type - Casualty - Repatriation; Aircraft - P 40 N, Kittyhawk A29-561; Place - Kamiri Strip, Noemfoor; Date - 1 August 1944 Access status: Open Location: Canberra	1941 - 1944		1057889

Note the difference in the highlighted dates

☐	A705	163/145/136	MORRISON Alan Wallace Campbell - (Flight Lieutenant); Service Number - 416186; File type - Casualty - Repatriation; Aircraft - Kittyhawk P40N A29 507; Place - Misool Island, N.E.1.; Date - 10 October 1944 Access status: Open Location: Canberra	1941 - 1951		1058985

Note the difference in the highlighted dates

☐	A11066	8/8/4	[Headquarters Eastern Area- Air Staff] Operations - Flying limitations - American aircraft [includes Kittyhawk and Buffalo] [0.25cm] Access status: Open Location: Canberra	1941 - 1942		3318103

The file itself says it was opened 25/5/42, NAA say 1941

Need I say more?

No. 3.

RESTRICTED

TECHNICAL ORDER No. 01-25CF-1

5B

HANDBOOK

OF

OPERATION AND FLIGHT INSTRUCTIONS

FOR THE

MODELS P-40D AND P-40E PURSUIT AIRPLANES

MANUFACTURED BY

CURTISS AEROPLANE DIVISION
CURTISS-WRIGHT CORP.

BUFFALO, N. Y.

Model	Contracts	Type Spec.	Model Spec.
P-40D	W535 AC-12414	98-610	98-610-3
P-40E	W535 AC-12414 & W535 AC-15802	98-610	7437

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APRIL 25, 1941

REVISED 9-5-41

WF-9-2-41-6M

INDEX

ILLUSTRATIONS

SECTION I

INTRODUCTION AND REFERENCES

1. This Technical Order is the Operation and Flight Instructions for the Models P-40D and P-40E Pursuit Airplanes. Pilots and other personnel who are required to understand the operation of this airplane will read and be familiar with the information contained herein.

2. Reference has been made in this Handbook to the following Technical Orders which contain applicable data and instructions:

T. O. No.	01-1-60	Use of Flaps
	02-5AB-1	Preliminary Operation Instructions - V-1710-27 and V-1710-29.
	03-5G-1	Inverters, Auxiliary Boxes & Lamp Assemblies
	03-5G-2	To be Issued
	03-10G-1	Operation of Carburetor Mixture Controls
	03-20BA-1	Operation and Flight Instructions - Curtiss.

SECTION II

DESCRIPTION

1. Airplane.

a. General. - The P-40D and P-40E Pursuit Airplanes are single-place, low wing monoplanes. The overall dimensions are: span 37 feet 3-1/2 inches, length 31 feet 8-3/4 inches, and height at rest 10 feet 9 inches.

b. Wing. - The wing is of the stressed skin cantilever type, built in two pieces and jointed at the center line of the airplane. The wing tips are detachable. The joint where the two wing sections connect together will serve as a skid in case of an emergency landing with the landing gear retracted. The ailerons are both dynamically and aerodynamically balanced. The left aileron is fitted with an electrically controlled trim tab, while the right aileron trim tab is fixed and can be adjusted only on the ground. The flaps are the split trailing edge type extending from the aileron to near the center line of the airplane and are operated hydraulically either by an electric pump or by the auxiliary hand pump. An indicator on the left side of the instrument panel shows the relative position of the flaps any time the ignition switch is turned on.

c. Empennage. - The fixed horizontal and vertical stabilizers are of all metal construction. The fabric-covered rudder and elevators are dynamically balanced, and are equipped with metal-covered, flush-type trim tabs controllable from the cockpit.

d. Fuselage. - The fuselage is of aluminum alloy semi-monocoque type with an engine mount constructed of steel bearer tubes supported by aluminum alloy forgings. The fuselage access door is on the left side of the fuselage just forward of the tail surfaces. The constructure behind the pilot is of sufficient strength to withstand nose-over loads.

e. Landing Gear. - (1) General: The landing gear is equipped with oleo pneumatic shock struts which retract by rotating backward about a trunnion at the top of the strut. During retraction the strut is rotated 90° about its longitudinal axis by gears so that the wheel lies flush in the wing. The gear is locked in both the up and down positions by hdraulically operated mechanical locks. An electric warning horn sounds when the throttle is closed except when the wheels are down and locked. An indicator on the left side of the instrument panel shows the relative position of the landing gear whenever the ignition switch is turned on.

(2) Wheels and Brakes: The landing gear is equipped with special 30" diameter wheels and 8 ply smooth contour tires. The hydraulic brakes are 12 x 3-1/4 inch.

(3) Tail Wheel: The tail wheel assembly includes a steerable knuckle unit with oleo pneumatic strut and a 12-1/2 inch smooth contour tire and wheel. The tail wheel is steerable throughout the range of the rudder movement and is provided with an automatic throwout permitting free swiveling throughout the remainder of the 360°. Throwout occurs at approximately 35° deflection from the longitudinal axis. The tail wheel is fully retractable and operates "clam shell" type doors which enclose it completely after retraction. An indicator on the left side of the instrument panel shows the relative position of the landing gear whenever the ignition switch is turned on.

2. Power Plant.

a. Engine. - The engine is the Allison V-1710-39 with compression ratio 6.65 to 1, impeller gear ratio 8.80 to 1 and propeller gear ratio 2 to 1. For further description and ratings refer to T. O. No. 02-5AB-1.

b. Propeller. - The propeller is a Curtiss Constant Speed electrically operated type, which may be controlled automatically or by manual selection. When controlled automatically, a predetermined engine speed is held constant by means of a governor set by the propeller control on the throttle quadrant. When controlled by manual selection, the blade angle may be varied by operation of the "Increase" or "Decrease R.P.M." switch control which is independent of the governor.

c. Oil System.- The design amount of oil in the tank plus the oil in the system is approximately 16 gallons. The oil outlet is thru a pendulum valve which allows a 90° dive, a 60° climb or a ten second inverted flight, without uncovering the oil outlet provided the tank is one-third or more full. The design oil in the tank is indicated by a rivet completely thru the center of the filler neck. The oil level should be maintained to this rivet at all times. Auxiliary oil is carried by adding 3 gallons as alternate load above the design capacity indicated by the rivet. The oil dilution equipment provided for winter starting is operated by a switch mounted on the left side of the main switch panel.

d. Fuel System. - Fuel is carried in three "Self-sealing" tanks with a total capacity of 145.5 gallons. The main tank of 51.0 gallons capacity and the reserve tank of 32.0 gallons capacity are in the center of the wing, and the fuselage tank of 62.5 gallons capacity is aft of the pilot in the fuselage. See Figs. 2 and 3 for the flow and main units of the fuel system. The main and reserve tank gages are on the cockpit floor. The dial indicator gage for the fuselage tank is located on the left side of the instrument panel. All fuel tanks are of rubber construction

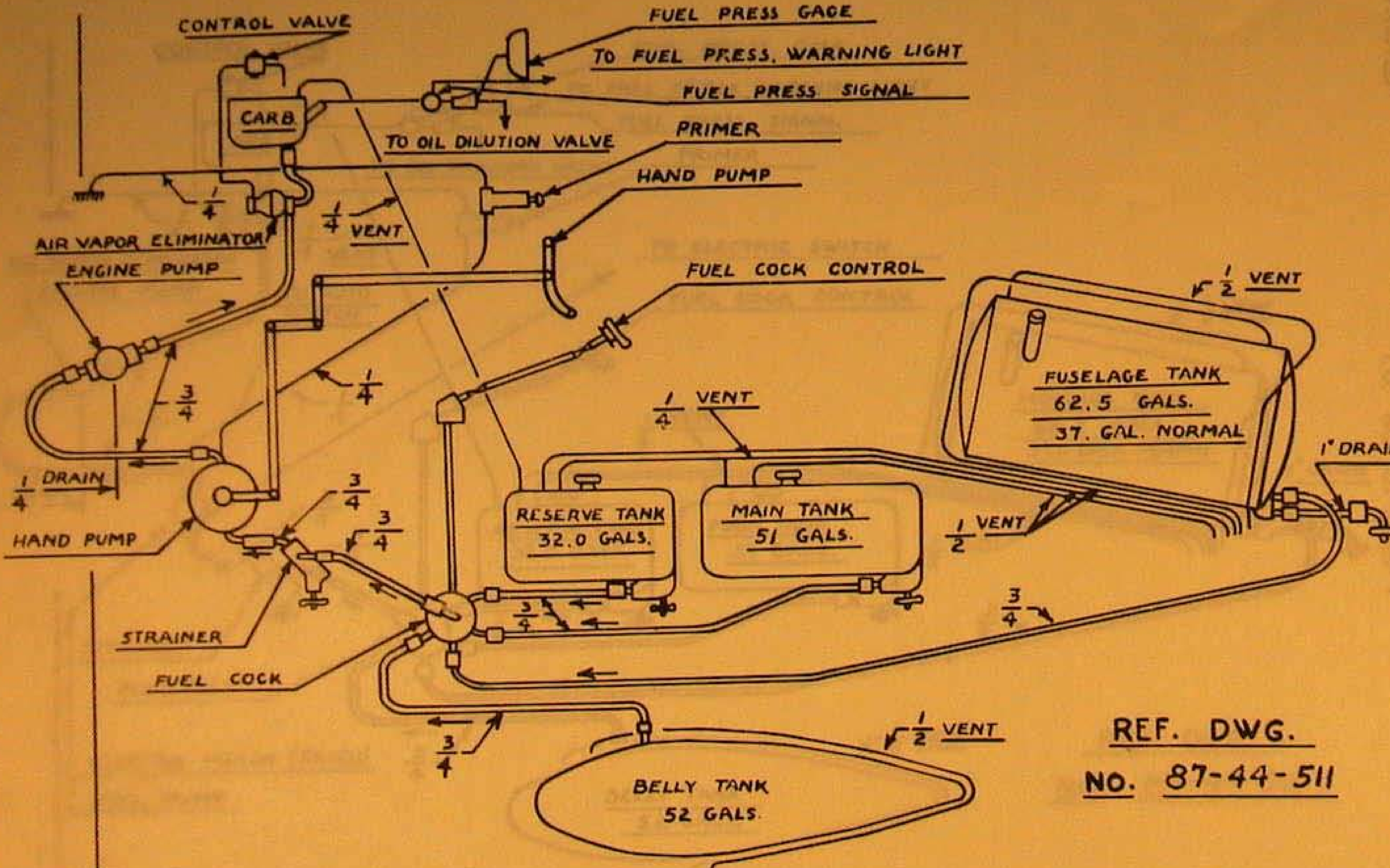


FIG. 2 - P-40D FUEL SYSTEM DIAGRAM

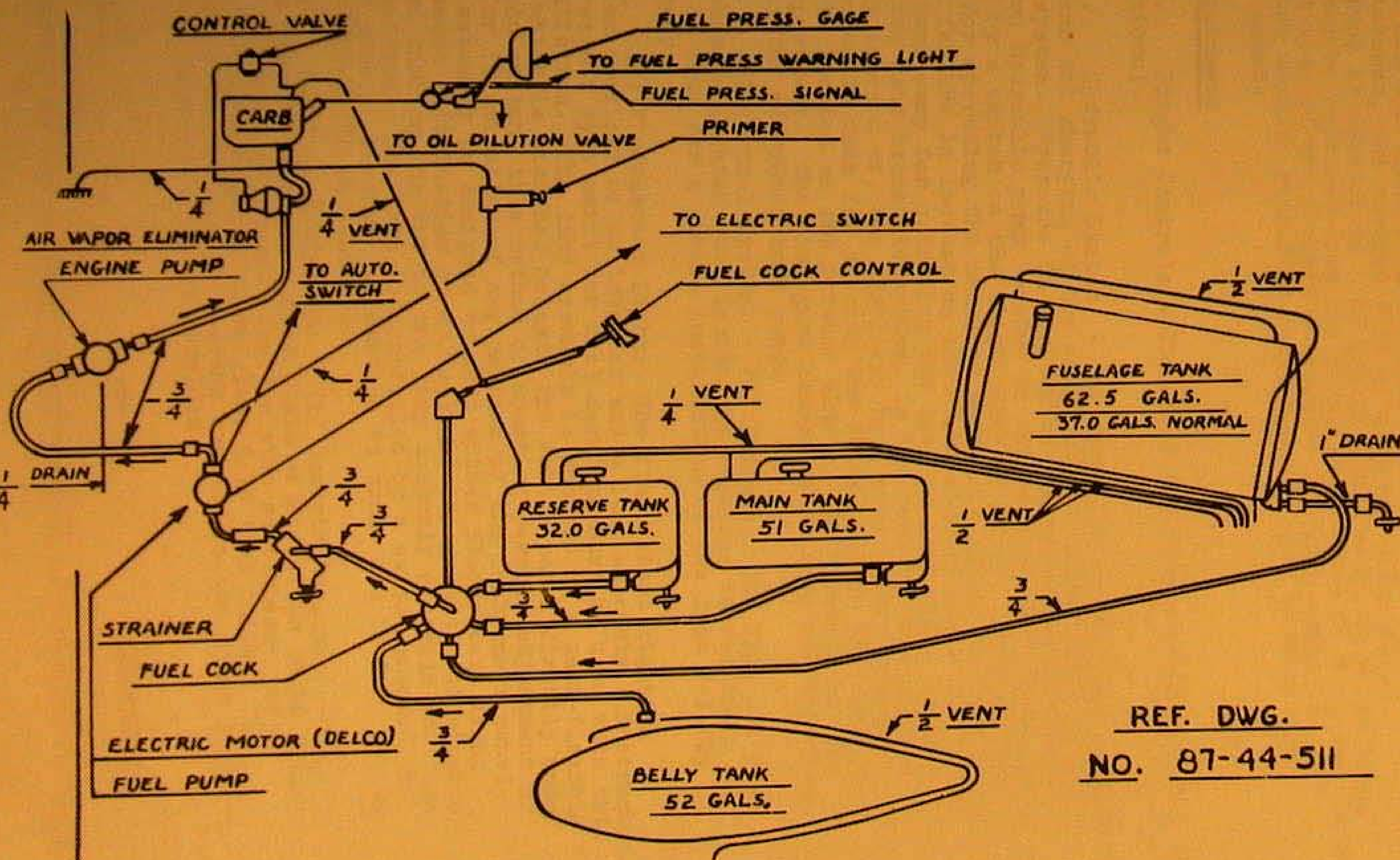


FIG. 3 - P-40E FUEL SYSTEM DIAGRAM

composed of six different layers firmly cemented together totaling 5/8 inch of thickness, and covered with an aluminum alloy shell. Auxiliary fuel is carried in a 52 gallon aluminum alloy belly tank. This tank may be released from the airplane by means of a handle located on the left side of the cockpit forward of the bomb controls. A fuel pressure warning signal is located on the left side of the instrument panel.

3. Equipment.

a. Flight Controls.- The stick and rudder pedal controls are conventional.

b. Hydraulic System. - The operation of the landing gear and flaps and the charging of the wing guns is accomplished by the hydraulic system. Pressure is applied to the system by an electrically driven hydraulic pump located in the rear of the fuselage and controlled by a switch on the flight control stick. An auxiliary hand pump for operating the complete hydraulic system in case of an electrical failure is located on the right side of the cockpit. An emergency hand pump for operating the landing gear only, in case of damage to the main hydraulic system, is the same as, and located immediately inboard of, the auxiliary hand pump. The emergency reserve hydraulic tank for storing the fluid used by the emergency hand pump is located on the forward side of the firewall in the engine compartment. The wing guns cannot be charged nor the flaps operated by the emergency hand pump.

c. Electrical System. - (1) Battery: The Type G-1 (24 volt) battery is located just inside the fuselage access door. Provision is made for a future installation of the Type F-1 (24 volt) battery.

(2) Fluorescent Light: The fluorescent lighting installation consists of an inverter and a lamp assembly. Instruments with fluorescent type paint for dial markings must be used with this type installation. The lamp assembly is mounted on a semi-flexible extension which is attached beneath the switch panel directly under the ignition switch, this method of mounting permits adjustment of the lamp for illumination of any portion of the instrument panel. This lamp assembly is designed to emit either fluorescent light for instrument illumination or white light for general illumination. The knurled knob on the end of the lamp assembly controls the type of light emitted. The lamp is controlled by a switch mounted on the switch panel. Further information is contained in T.O. No. 03-5G-1 and 03-5G-2 (To be issued).

d. Fuselage Equipment. - (1) Cockpit Enclosure:- The windshield front section is a flat plate of 1-1/2 inch thick bullet-resistant "Multiplate" glass. The two side sectionsare curved sections of non-shatterable plate glass 5/16 inch thick. The sliding canopy is operated by a crank mounted on the right longeron. An emergency canopy release is provided.

(2) Miscellaneous: A seat, safety belt, map case, data case and duffle bag are provided. The data case duffle bag, and engine and airplane tool kit are accessible thru the fuselage access door.

(3) Armour Plate: Armour plate is installed fore and aft of the pilot. The armour plate which completely shields the pilot from the rear is 5/16 inch thick. The armour plate in front of the pilot is 3/8 inch thick.

e. Heating and Ventilating Equipment. - A cockpit heating and ventilating system is operated by a push-pull control located below the instrument panel.

f. Oxygen Equipment. - A Type F-1 low pressure oxygen cylinder is permanently installed in the aft part of the fuselage and is accessible thru the fuselage door. A Type A-9 oxygen regulator is located on the floor of the cockpit at the right of the pilot. The oxygen cylinder filler valve is located immediately aft of the access door.

g. Communications Equipment. - The Type SCR-283 command radio set is installed with controls and microphone grouped on the right side of the cockpit. The Hi-Lo frequency switch for the receiver is also located on the right side of the cockpit.

h. Bombing Equipment. - The bomb load carried may be either six 20 lb. Type M42 fragmentation bombs, or six 20 lb. Type T7 practice bombs. The manual control for bomb release is accomplished by means of the L-21A bomb release handle on the floor of the cockpit at the left of the pilot. The electrical release is accomplished by means of the button on the Modified B-4 trigger switch on the control stick, and by the "BOMB" selector switch.

i. Gunnery Equipment. - (1) Gunnery Equipment for P-40D airplane:

(a) Wing Guns: Two hydraulically charged .50 caliber model M-2, fixed machine guns are mounted in each wing panel outside of the propeller disc. They are fired by operating the Modified Type B-4 trigger switch on the control stick in conjunction with a safety on the left side of the main switch panel. The safety switch has two positions, all guns either "ON" or "OFF". The wing guns may be charged by actuating the hydraulic control valves mounted under the main switch panel. Should the electric hydraulic pump fail, pressure may be kept in the lines by use of the outboard auxiliary hand pump. Provisions are made for 1,000 rounds (250 rounds per gun) of .50 caliber ammunition with links as design load and 2460 rounds (615 rounds per gun) as alternate load.

(b) Cannon: Provisions for external attachment of 20 mm. Hispano-Suiza Birkgit cannon are made on the under surface of the wings just outboard of the outer .50 caliber gun. One cannon may be mounted under each wing panel by making the proper skin cutouts and installation of the equipment.

(c) Gun Sight: The Type N-3 optical gun sight with a modified reflector holder is installed, and is designed for full adjustment.

(d) Gun Camera: An aiming point type miniature gun camera can be mounted on the gun sight and operated by the trigger switch on the control stick in conjunction with the "CAMERA" toggle switch on the main switch panel.

(2) Gunnery Equipment for P-40E airplane: The P-40E has six .50 cal. model M-2 machine guns controlled and fixed the same as the four wing guns on the model P-40D airplane. No provisions are made for cannon. Provisions are made for the 1410 rounds (235 rounds per gun) of .50 caliber ammunition with links as design load, and 1686 rounds (No. 1 gun 312, No. 2 gun 291, No. 3 gun 240 rounds) as alternate load. The gun sight and gun camera are the same as for the P-40D airplane.

SECTION III.

GENERAL INSTRUCTIONS.

1. Location of Controls.

a. Flight Controls. - (1) Rudder Trim Tab: Left side of cockpit.

(2) Elevator Trim Tab: Left side of cockpit.

(3) Aileron Trim Tab: Center of Main Switch Panel.

b. Landing Gear Controls. - (1) Hydraulic Pump Switch: On control stick below trigger switch.

(2) Auxiliary Hydraulic Hand Pump: At right side of cockpit.

(3) Emergency Hydraulic Hand Pump: At right side of cockpit, just inboard of auxiliary hydraulic hand pump.

(4) Landing Gear Control Handle: At pilot's left. (Separate from flap control handle).

(5) Flap Control Handle: At pilot's left. (Separate from landing gear control handle).

(6) Landing Gear Warning Horn Disconnect Switch: On left side of cockpit forward of main switch panel and operated by an arm on the throttle rod.

(7) Brakes: On rudder pedals.

(8) Parking Brake: Push-pull knob at the left side of the instrument panel.

c. Power Plant Controls - (1) Throttle and Mixture Controls: Type B-21 engine control assembly on pilot's left.

(2) Propeller Control Switches: Left side of the main switch panel.

(3) Ignition Switch : Left side of main switch panel.

(4) Wobble Pump Control for P-40D: Forward of the engine control assembly.

Figure 4.

Cockpit Arrangement and Controls - Left Side

(To be issued when available).

Figure 5.

Cockpit Arrangement and Controls - Right Side

(To be issued when available).

(5) Electric Fuel Pump for P-40E: Switch on left side of main switch panel.

(6) Primer Control: Right side of cockpit below the main switch panel.

(7) Fuel Selector Control: On left side of cockpit below the engine control quadrant.

(8) Carburettor Heat Control: On right side of the instrument panel.

(9) Cooling System Controls: A handle on right side of cockpit adjusts the position of the cowl flaps.

(10) Starter Control Switch: the starter control switch is located in a junction box on the cockpit floor immediately under the instrument panel and is actuated by a foot treadle mounted on the cover.

d. Other Controls. - (1) Electrical Controls: The following electrical controls are located on the main switch panel : -

(a) Spotlights (Two) Switch.

(b) Pitot Heater Switch.

(c) Running Lights Switch.

(d) Landing Light Switch.

(e) Generator Circuit Switch.

(f) Oil Dilution Switch.

(g) Coolant & Fuel Pressure Test Switch.

(h) Fluorescent Light Switch.

(i) Electric Fuel Pump Switch.

(j) Ammeter.

(k) Gun Sight Rheostat.

(l) Compass Rheostat.

(m) Formation Lights Rheostat.

(2) Rudder Pedal Adjustment: Inboard side of each rudder pedal.

(3) Pilot's Seat Adjustment: Right side of seat.

(4) Oxygen Controls: Right side on floor of cockpit.

(5) Radio Switches: Right side of cockpit.

(6) Coolant System Warning Light: Right side of instrument panel.

(7) Heating and Ventilating Control: Push-pull handle located under the right side of the main switch panel.

(8) Bomb Release: Lower left side of cockpit.

(9) Belly Tank Release: Lower forward left side of cockpit.

(10) Cockpit Enclosure: The sliding canopy is operated by a crank located on the right longeron at the base of the wind-shield.

(11) Gun Camera Control: Lower left side of cockpit.

(12) Gun Charging Controls: Below main switch panel.

2. Operation of Controls.

a. Flight Controls. - (1) General: Operation of the rudder pedals and control stick is conventional. Three different adjustment positions of the rudder pedals may be obtained by pushing inboard on the control levers and moving the rudder pedal forward or aft to the desired position. The control is spring operated and snaps back into place automatically when the levers are released.

(2) Rudder Trim Tab: Rotate clockwise to obtain right yaw.

(3) Elevator Trim Tab: A crank handle is provided for rapid adjustment. Rotate clockwise to lower nose.

(4) Aileron Trim Tab: Raise switch to raise left wing. The switch returns to neutral "OFF" position when released allowing the trim tab to remain as adjusted.

(5) Normal Operation of Flaps: Move control handle forward to lower flaps and aft to raise flaps. After placing control handle, squeeze the hydraulic pump switch below the control stick until the operation is complete and then return control handle to the normal position. Further instructions pertaining to the operation of the flaps is contained in T.O. No. 01-1-60.

(6) Emergency Operation of Flaps: If the electrical system fails, operate flaps by means of auxiliary hydraulic hand pump.

b. Landing Gear Controls. - (1) To Retract Landing Gear: Slide the safety latch bolt on the control handle forward and raise the handle to the up position. Then operate the hydraulic pump switch below the control stick until retraction is complete. Return lever to neutral position after completion of operation.

(2) To Lower Landing Gear: Place control handle in the down position and operate the hydraulic pump switch below the control stick until a few seconds after the indicator and warning horn indicate that the gear is down, at which time the down position locks will be engaged. If a further check is desired, move the auxiliary hydraulic hand pump lever. If a high load is required to move this lever the operator can be certain that the gear is locked down. Then return the control handle to the neutral position. The safety latch bolt prevents the accidental raising of the handle beyond the neutral position.

(3) Emergency Landing Gear Operation: If the electrical system should be inoperative, the landing gear can be operated by the auxiliary hydraulic hand pump. Should the auxiliary hand pump fail, as a last resort the landing gear should be operated by means of the emergency hydraulic hand pump.

(4) Warning Horn Disconnect Switch: Pull out the cam on throttle rod to disconnect switch temporarily. Automatic engagement of the switch results the next time the throttle is opened to its stop, bringing the horn back into operation.

(5) Brakes: The brakes are operated by the conventional toe-operated pedals. The parking brake lever may be engaged by pulling it when the pedals are depressed. It is automatically disengaged when the pedals are again depressed.

c. Power Plant Controls. - (1) General: Complete operation and flight instructions for the engine are contained in T. O. No. 02-5AB-1.

(2) Mixture Control: Refer to T.O. No. 03-100-1. The four main positions of the mixture control are : "Idle Cut-Off", "Automatic Lean", "Automatic Rich" and "Full Rich". The mixture should be at "Automatic Rich" for any take-off. The "Automatic Rich" position should be used for normal flight conditions, climb and level flight at normal and military power ratings, cruising and landing. The extreme rear position of the mixture control is "Idle Cut-Off".

(3) Starting: When starting the engine, perform the following operations in the sequence given below.

(a) Pull the engine through by hand, with ignition off, if it has been idle for more then two hours.

(b) Carburettor heat control on "COLD".

(c) Cooling system shutter control as required.

(d) Main line switches on.

(e) Propeller switch "ON" - control set for take-off R.P.M.

(f) Throttle set from 800 to 1000 R.P.M.

(g) Mixture control at "Idle Cut-Off" position.

(h) Wobble pump to 4 lbs. pressure.

(i) Prime two to four strokes.

(j) Mixture Control - to "Auto. Rich".

(k) "Energize" starter.

(l) "Engage" starter.

(m) Do not wobble pump to more than 4 lbs. pressure with the mixture control out of "Idle Cut-Off" position. Prime to keep the engine from stalling. Pumping the throttle does not prime the engine.

CAUTION : If engine does not fire, return mixture control lever to idle cut-off immediately.

(4) Stopping: Stop engine in accordance with T.O. No. 02-5AB-1. Before switching off engine in cold weather hold this toggle in the "ON" position for about four minutes with an engine speed of 800 R.P.M. for oil dilution.

(5) Propeller Control Switches: Set the safety switch which is of the circuit breaker type, to the "ON" position whenever the propeller control is desired. If the switch throws out and will not stay in the "ON" position, a short circuit or an overload is indicated, in which event the pitch should be changed only if absolutely necessary. For controlling the propeller pitch manually, set the selector switch to "Manual" and "Decrease" or "Increase" the pitch with the manual control so marked. See T.O. No. 03-20BA-1 for additional operating instructions. For automatic constant speed control, set the selector switch to "Automatic", and set the manual selector for automatic control as follows.

(a) For Take-Off: Set for 3000 R.P.M.

(b) During Flight: Set the propeller control for the desired R.P.M.

(c) For Landing: Set the propeller control for 2770 R.P.M. to prevent overspeeding of the engine in case a sudden burst of power is applied.

NOTE: The markings on the propeller control are approximate. The desired R.P.M. should be obtained accurately by reading the tachometer.

(6) Ignition Switch: The ignition switch has five positions, "OFF", "BATTERY", "LEFT", "RIGHT" and "BOTH". The battery circuit is closed at all times except when the switch is in the "OFF" position, then the battery circuit is open. The switch in the "LEFT" or "RIGHT" position indicates that the corresponding magneto circuit is open. All circuits are safetied through the ignition switch.

(7) Wobble Pump Control for P-40D: The fuel pressure necessary for starting is obtained by manual operation of this pump.

(8) Electric Fuel Pump for P-40E: The fuel pressure necessary for starting is obtained by a G-6 fuel pump driven by an electric motor (Delco).

(9) Primer Control: The primer control is pulled out to prime the engine.

(10) Fuel Selector Control: The five settings of this control are: "OFF", "RESERVE WING", "MAIN WING", "FUSELAGE" and "BELLY" tanks. The selection of the tank to be used is made by turning the selector handle to the desired tank as shown on the dial.

(11) Carburettor Heat Control: This control operates a hinged vane in the carburettor air intake duct elbow and permits either warm air from the engine compartment or cold air from the outside to enter the carburettor.

NOTE: The engine should be operated on "COLD" at all times unless engine behaviour leads the pilot to believe that carburettor icing conditions are being experienced and in that case the control should be moved to the "FULL HOT" position. If this does not clear up the trouble the control should again be returned to the "COLD" position.

(12) Cooling System Controls: When the handle is all the way up the radiator shutters are closed. An intermediate position designated "NEUTRAL" and determined by the indicator plate on the control assembly, is used for high speed operation. For ground running, taxiing, take-off and climb the control should be adjusted to maintain the proper engine temperature. A warning light to indicate excessive coolant temperatures is provided. This warning light will indicate when the pilot should adjust radiator shutters.

d. Other Controls. - (1) Electrical Controls on Main Switch Panel:

(a) Spotlights: The two spotlights are turned on by raising the toggle to the "ON" position.

(b) Pitot Tube Heater Switch: Raise the toggle to the "ON" position to heat the pitot tube.

(c) Running Lights Switch: These lights are turned on by raising the toggle up to the "ON" position. They may be used for signalling by holding the toggle down to the "SIGNAL" position which is a momentary contact.

(d) Landing Light Switch: This switch has "ON", "RETRACT", and neutral "OFF" positions. By placing the toggle in the "ON" position, the landing light swings out of the left wing. The light automatically lights after passing the center line of the pivot. By placing the toggle in the "RETRACT" position, the landing light retracts and the light is automatically turned off. The toggle returns to the "OFF" position at the completion of the operation.

CAUTION: Avoid burning the light longer than three minutes.

(e) Generator Circuit Switch: This switch, used only when the ship is on the ground, is for testing the circuits that are safetied through the ignition switch.

(f) Coolant and Fuel Pressure Test Switch: This is a double throw switch with two "ON" positions and a neutral "OFF" position. The coolant test "ON" position is upward, and the fuel pressure test "ON" position is downward. Both positions of this test switch are momentary and are used to test the operation of their respective warning systems.

(g) Fluorescent Light Switch: Raise the toggle to the "ON" position to light the fluorescent lamp.

(h) Electric Fuel Pump Switch: Raise the toggle to the "ON" position to actuate the electric motor driving the fuel pump.

(i) Ammeter: This dial shows the amperage of the system at the battery solenoid switch.

(j) Compass, Gun Sight and Formation Lights Rheostats: The three rheostat knobs control the intensity of the light for their respective systems. The "OFF" position is when the rheostat is at the stop when turned counter-clockwise. To turn "ON" and to increase the intensity of the light turn the rheostat knob clockwise as indicated by the arrow.

(2) Rudder Pedal Adjustment: Move the adjusting control release inboard and locate the rudder pedals in the desired position. There are three positions obtainable.

(3) Pilot's Seat Adjustment: The pilot's seat may be raised or lowered by pulling back on the adjustment handle and adjusting the seat to the desired height. The handle is spring operated and snaps back into place automatically when released.

(4) Oxygen Controls: The manually operated control valve is opened by turning to the left, as indicated by the arrow on the control knob.

(5) Radio Controls: To operate, turn receiver control switch to "MANUAL" for receiving radio range stations (otherwise "AUTO" may be used) and set the transmitter switch to "VOICE". Set Hi-Lo switch to desired receiver frequency of the station and adjust the volume suitably. To transmit by voice, press the throttle button and speak slowly and clearly in a normal tone of voice. To turn the radio off, set the receiver control switch to "OFF".

(6) Heating and Ventilating Control: When the control is pulled out hot air enters the cockpit, when pushed in cold air enters the cockpit. A mixture results when the control is in an intermediate position. In cold weather closing the radiator shutters increases the heat.

(7) Cockpit Enclosure: The operating crank may be disengaged in case of emergency by pulling to the disengaged position. An emergency canopy release handle is at the top forward frame of the cabin. In case of emergency, while in flight, the entire canopy may be released from the fuselage by pulling on the handle. In case of turnover, on the ground: pull release handle at the bottom of hatchout panel and push open the emergency exit panel on the left side of the canopy. This panel may also be released from the outside by operating the handle located on the lower, left cabin frame.

SECTION IV.

SPECIAL INSTRUCTIONS.

1. Flying Limitations.

a. Maneuvers Prohibited. - (1) Outside Loop.

(2) Inverted flight.

(3) Inverted spin.

(4) Snap roll at speed in excess of 175 M.P.H. indicated.

(5) Slow roll at speed in excess of 300 M.P.H. indicated.

(6) Spin of more than three turns.

(7) Spin with baggage, auxiliary fuel or any other overload.

b. Other Restrictions. - (1) Do not exceed an indicated airspeed of 485 M.P.H.

(2) Do not exceed an engine speed of 3120 R.P.M. in dives.

(3) Do not begin to lower flaps at airspeed in excess of 140 M.P.H. indicated.

(4) Do not begin to lower landing gear at an indicated airspeed in excess of 175 M.P.H.

(5) Do not begin to lower radiator shutters at an indicated airspeed in excess of 175 M.P.H.

(6) Do not begin to lower landing light at an indicated airspeed in excess of 175 M.P.H.

(7) Climbs up to 60° and dives up to 90° will be performed only with 1/3 or more of the maximum oil capacity.

(8) Do not exceed a maneuver acceleration of +8.0 G positive or -4.0 G negative with a maximum alternate gross weight load.

(9) Do not exceed a maneuver acceleration of +7.2 G positive or -3.6 G negative with a maximum alternate gross weight.

2. Warnings.

a. When intending to operate the flaps while plane is on the ground, make certain that the landing gear control is not operated by mistake.

b. Avoid unnecessary landing and excessive use of brakes when loaded in excess of the normal gross weight.

c. Before starting engine, taxiing or landing be sure that the landing gear warning horn will sound when the throttle is closed and the battery circuit is on.

d. The gun selector switch must be "OFF" prior to operating the flaps or landing gear so that the guns will not be accidentally fired if the trigger switch is squeezed instead of the hydraulic pump switch.

e. In flight, the flaps will go up automatically as soon as the control is set in its "UP" position. Caution should be exercised to anticipate the sudden resultant loss of lift.

SECTION V

FLYING CHARACTERISTICS

(To be issued when available)

RESTRICTED

1. Weight

Weight
Weight

Useful
Crew
Fuel

Alte

Oil
Oil

Armamen
Guns,
Ammun
Ammun
Bombs
Armor
Misce

Armamen
Guns,
Ammun
Ammun
Bombs
Armor
Misce

Miscell
Gun
Bagge
Auxil
Radio

Design
Design

Maximum
Maximum

Wing Lo
Wing Lo

Power L
Power L

SECTION VI
WEIGHT DATA

1. Weight in Pounds (Calculated)	Maximum Alternate	Design
Weight Empty (With Radio Installed) P-40D	5894	5894
Weight Empty (With Radio Installed) P-40E	5982	5982
Useful Load		
Crew (Pilot and Parachute)	180	180
Fuel 120 Gallon, Design	720	720
(32.0 Gal. Front Wing Tank)		
(51.0 Gal. Rear Wing Tank)		
(37.0 Gal. In Fuselage Tank)		
Alternate Load 25.5 Gal. (Fuselage Tank-Special)	153	
52.0 Gal. (Belly Tank)	312	
Oil Design 16 Gal. (13 Gal. Main Tank and 3 Gal. System)	120	120
Oil Alternate 3 Gal. (Maximum capacity-Filled to Cap)	22.5	
Armament P-40D		
Guns, Wing - 4 - .50 Cal. M-2	256	256
Ammunition - Design - 1000 Rounds	-	300
Ammunition - Maximum - 2460 Rounds	738	
Bombs - 6 - #20 Lb. Bombs	143	
Armor Plate	108.5	108.5
Miscellaneous Equipment for Wing Guns	65.5	65.5
Armament P-40E		
Guns, Wing - 6 - .50 Cal. M-2	384	384
Ammunition - Design - 1410 Rounds		423
Ammunition - Maximum - 1870	561	-
Bombs - 6 - #20 Lb. Bombs	143	
Armor Plate	108.5	108.5
Miscellaneous Equipment for Wing Guns	94	94
Miscellaneous Equipment		
Gun Camera, 24 Volt	3.0	-
Baggage Maximum		
Auxiliary Tank and Supports	54.0	-
Radio Spare Coils	8.0	
Design Gross Weight P-40D		7944
Design Gross Weight P-40E		8011.5
Maximum Alternate Gross Weight P-40D		8777.5
Maximum Alternate Gross Weight P-40E		8845.0

Wing Loading, Design Gross Wt. 33.9 Lbs/Sq.Ft. P-40D
Wing Loading, Design Gross Wt. 34.2 Lbs/Sq.Ft. P-40E

Power Loading, Design Gross Wt. 7.94 Lbs/H.P. P-40D
Power Loading, Design Gross Wt. 7.99 Lbs/H.P. P-40E

(DTSD102/42.)

ARCHIVES II

NATIONAL ARCHIVES AT COLLEGE PARK

USING TECHNOLOGY

TO SAFEGUARD

ARCHIVAL RECORDS

THE NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA) completed construction of a new facility, the National Archives at College Park, in 1993. Informally known as Archives II, it is the largest and most technically advanced archives building in the world. As it was built primarily to protect the Nation's records, extreme care was taken to design and construct a building that would offer the best possible conditions for the storage, preservation, and use of the archival materials.

The historic National Archives Building, located on Pennsylvania Avenue in Washington, DC, was completed in 1935 and reached its records storage capacity by 1970. To alleviate the space shortage, more than 500,000 cubic feet of records received since 1970 were diverted to the Washington National Records Center in Suitland, MD, and to a leased building in Alexandria, VA. However, these temporary facilities did not meet the criteria set by the National Institute of Standards and Technology for the storage of archival records. Repeated attempts to obtain official support for a new archives building were unsuccessful until after the National Archives regained its status as an independent Federal agency in 1985. In 1987, Congressman Steny H. Hoyer, with the aid of Maryland Senators Barbara Mikulski and Paul Sarbanes, persuaded the University of Maryland to donate 33 acres of land for a new archives building and initiated the legislative process to authorize and finance it. On September 22, 1988, President Ronald Reagan signed the public law authorizing NARA to construct and finance a new archives facility. The groundbreaking ceremony took place on October 17, 1989. The George Hyman Construction Company completed the construction of Archives II in July 1993, and the first NARA staff moved into the building that October.

Designed by Hellmuth, Obata and Kassabaum, architects, and Ellerbe Becket, engineers, the 1.8 million-square-foot building includes records processing and storage areas (stacks), a five-level research center, conservation and special media laboratories, offices, conference and training facilities, an auditorium, a cafeteria, a day care center, and an exercise facility. The central focus of the Archives II design was to create a building with state-of-the-art systems and environments that adhered to the strict conditions necessary for the long-term protection of records. In particular, special attention was given to the design and construction of the records storage environments, the mobile shelving system, fire protection, and security. In addition, the finishes and materials used in the construction of the stacks were carefully studied and selected to minimize the exposure of the records to harmful contaminants. This publication details these design efforts and the resulting systems in operation at Archives II.

CREDITS
Photography: Maxwell Mackenzie, Earl McDonald, Larry Glenn, Spacesaver Corporation
Design: Jennifer Stolk, MacVicar Design + Communications, Inc.

Why Controlled Environments?

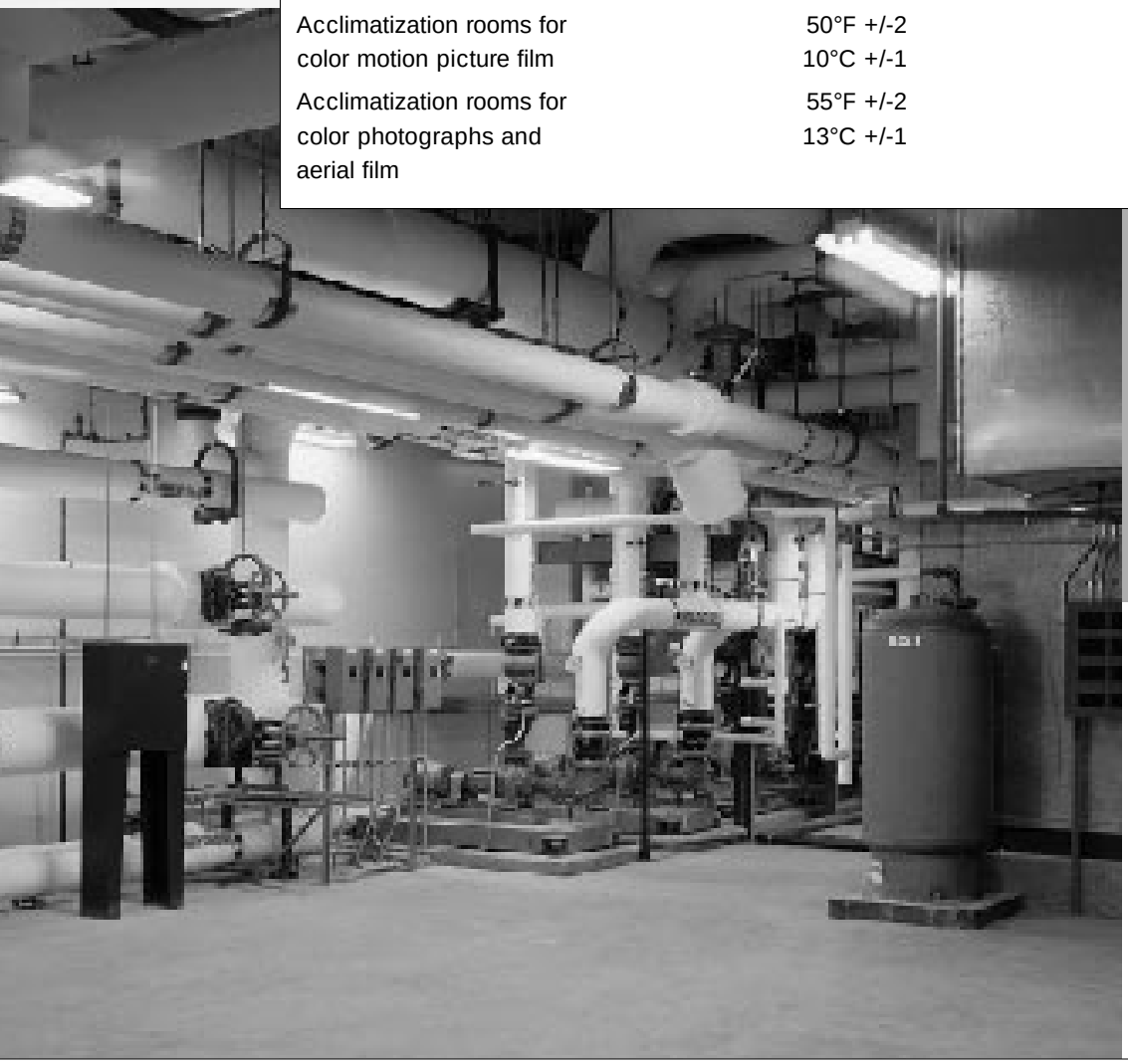
Pleated degas filters remove gaseous pollutants from the records storage areas.

Archives II can house nearly 2 million cubic feet of the permanently valuable records of the Federal Government. In order to achieve the best possible storage conditions, the design effort for the building had to consider the development of mechanical systems that provided strict environmental standards in the records storage areas (or stacks). In addition to maintaining stable and constant temperature and relative humidity levels, the removal of damaging particulate materials and gasses from the air is particularly important to the preservation of archival records. Conditions at Archives II follow guidelines established by the National Academy of Science, the NARA Document Conservation Branch, and other archivists and scientists. The conditions selected for the Archives II records storage environments represent what NARA believes to be a fair balance between providing the best protection for the records and allowing researchers to use and copy them.

Temperature and Relative Humidity

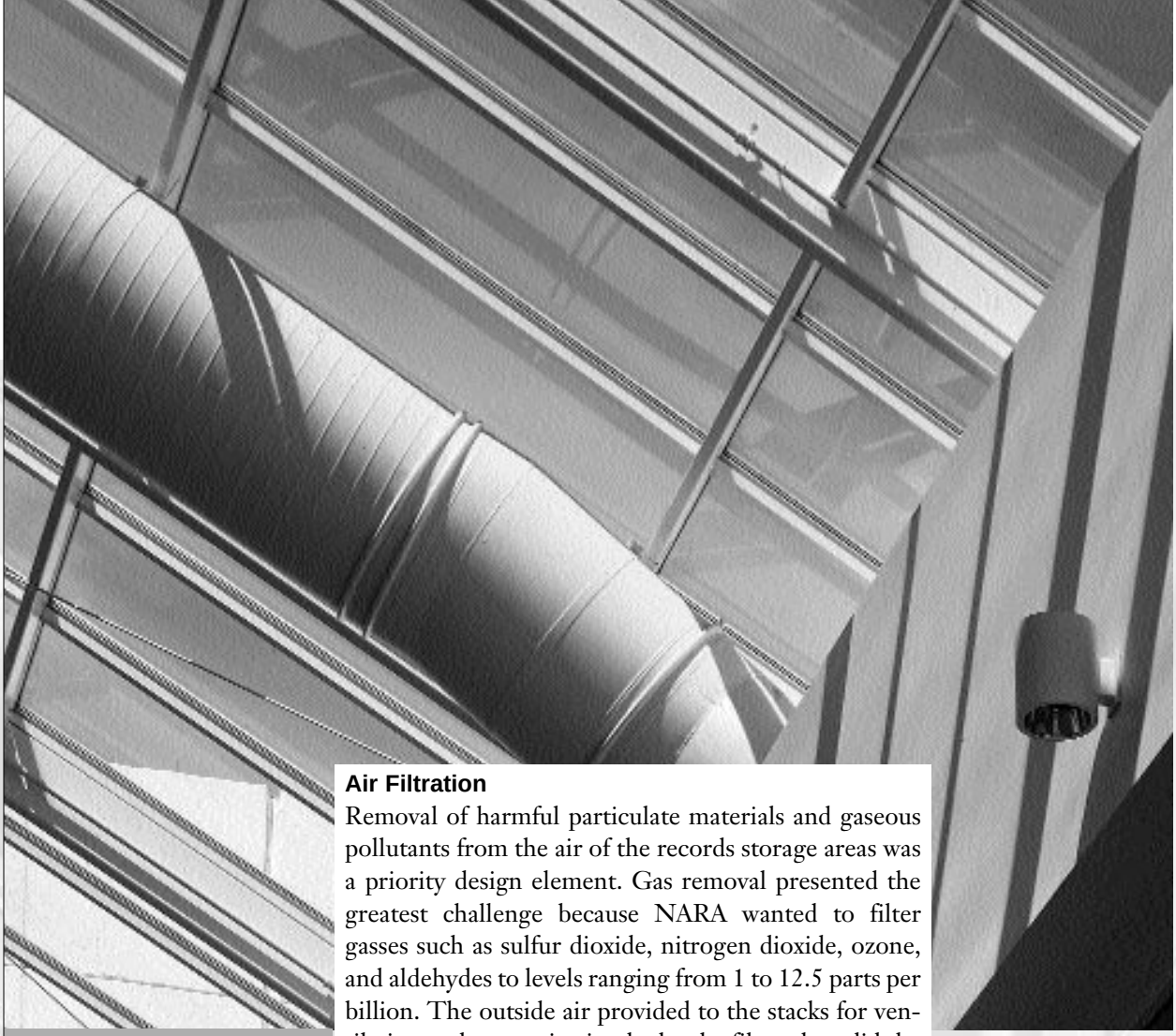
Temperature and humidity requirements for the stacks vary, depending on the type of materials being stored. The crucial design task was to ensure that these different conditions remain stable and constant.

Record Type	Temperature	Relative Humidity
Textual and cartographic records	70°F +/-2 21°C +/-1	45% +/-5 45% +/-5
Black-and-white motion picture film, audiotapes, and sound recordings	65°F +/-2 18°C +/-1	30% +/-3 30% +/-3
Color motion picture film	25°F +/-2 -4°C +/-1	30% +/-3 30% +/-3
Black-and-white photographs, glass plate negatives, negatives, slides, and posters	65°F +/-2 18°C +/-1	35% +/-3 35% +/-3
Aerial film	38°F +/-2 3°C +/-1	35% +/-3 35% +/-3
Magnetic media	65°F +/-2 18°C +/-1	35% +/-3 35% +/-3
Nixon Presidential textual records, gifts, and audiovisual records	65°F +/-2 18°C +/-1	35% +/-3 35% +/-3
Acclimatization rooms for color motion picture film	50°F +/-2 10°C +/-1	30% +/-3 30% +/-3
Acclimatization rooms for color photographs and aerial film	55°F +/-2 13°C +/-1	35% +/-3 35% +/-3



Pressure-reducing stations at various points in the building reduce the steam pressure from 110 pounds per square inch to 15 pounds per square inch for use in heat exchangers, heating coils, and some humidifiers.

Chilled water and glycol systems cool the air in both the outside air and stack air handling units.



The atrium spaces in Archives II are designed with their own air handling systems.

Air Filtration

Removal of harmful particulate materials and gaseous pollutants from the air of the records storage areas was a priority design element. Gas removal presented the greatest challenge because NARA wanted to filter gasses such as sulfur dioxide, nitrogen dioxide, ozone, and aldehydes to levels ranging from 1 to 12.5 parts per billion. The outside air provided to the stacks for ventilation and pressurization had to be filtered, as did the stack return air, which contained gasses originating from the stored archival materials.

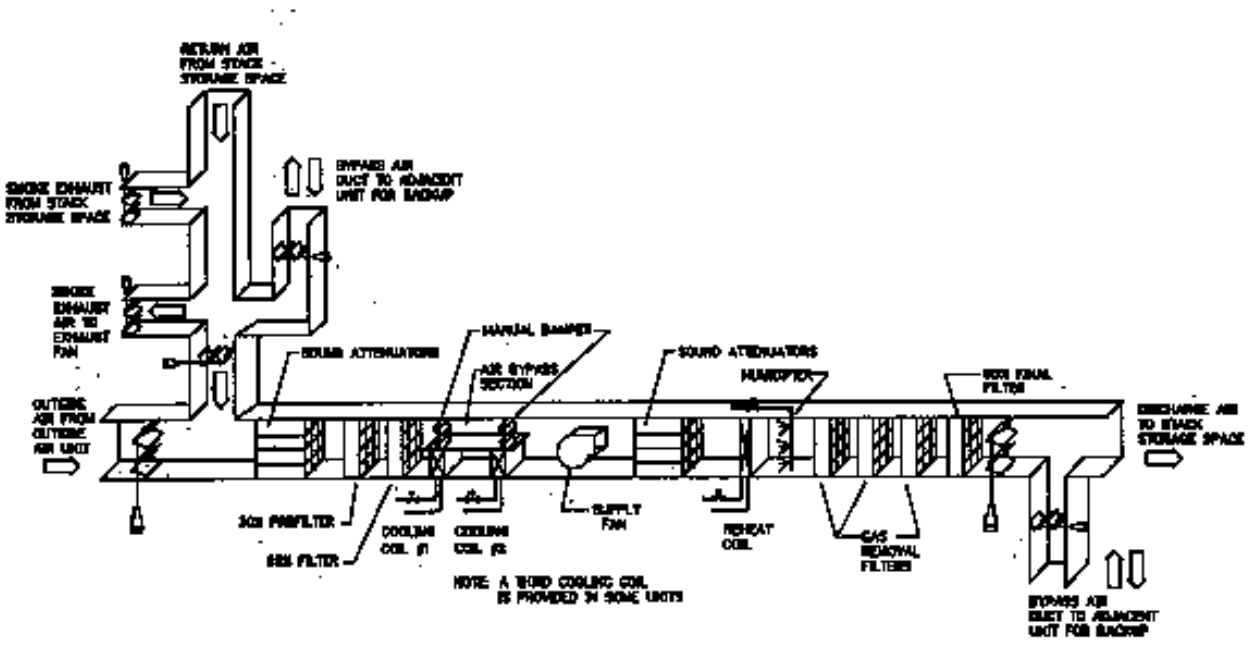
Air Handling System

The Archives II air distribution system consists of both an outside air handling system and a stack recirculating air handling system. Both deliver a consistent-volume air supply in order to maintain uniform temperatures and humidity levels in the stacks. The air in the stacks is primarily recirculated, but it does receive up to 10-percent fresh air from the outside units.

The archival storage areas, totaling 691,572 square feet, are arranged horizontally and vertically like shoe boxes. There are five storage spaces at the base, with as many as five storage spaces stacked above them. Mechanical rooms are found at three locations on each floor between the stacks. The mechanical rooms are similarly stacked above one another and contain air handling units that provide air to the adjacent stacks. The heating and cooling distribution piping that serves these units extends vertically from a tunnel area through these mechanical rooms to the mechanical penthouses (which contain 100-percent outside air handling units).

The stacked mechanical rooms between storage areas contain two air handling units, each serving the adjacent storage space. Each pair of air handling units has interconnecting bypass supply-and-return ductwork and dampers. Opening and closing the dampers allows limited back up supply-and-return air capability to a storage space during those times when the adjacent unit servicing that area is deactivated for maintenance or repairs.

To maintain these varied temperatures and relative humidities, the design had to incorporate means of preventing moisture migration through the structure, removing moisture from the outside air used for ventilation, and removing excess moisture in the stacks. Moisture migration from the exterior was addressed by using precast concrete panels backed by metal, double-walled insulated panels. Moisture migration into the stacks from interior spaces was alleviated through the use of glazed block. The removal of moisture was addressed by the air handling system.



TYPICAL STACK AIR HANDLING UNIT

Stack mechanical rooms are located between records storage areas and contain two air handling units, each serving the adjacent storage space.

Outside air entering at the roof passes through a 30-percent prefilter and then through a 65-percent filter to remove particulate matter. The air is then either heated by steam preheat coils or cooled by chilled water and glycol cooling coils to a final discharge temperature of 46 degrees Fahrenheit before further air treatment. The tempered air then passes through four banks of degas filters designed to remove sulfur dioxide, nitrogen oxide, and ozone and finally through a 95-percent particulate filter. At the stack air handling units, the treated air and the recirculated air pass through another set of 30-percent and 65-percent particulate filters. The air flow divides–some to the additional cooling coils and some around the coils via fixed dampers. The resulting air mixture then passes through a hot water heating coil and a clean steam humidifier that uses deionized water for final air tempering and moisture adjustment as required. The air passes once more through three banks of degas filters to remove formaldehyde and then through a final 95-percent particulate filter.

In order to keep the system uniform, the air is distributed into the stacks at ceiling level and returned to the stack air handling units via return ducts located approximately 24 inches above the stack floors. Temperature and humidity sensors are located within the stack ductwork to maintain the set points.

Air Filtration System

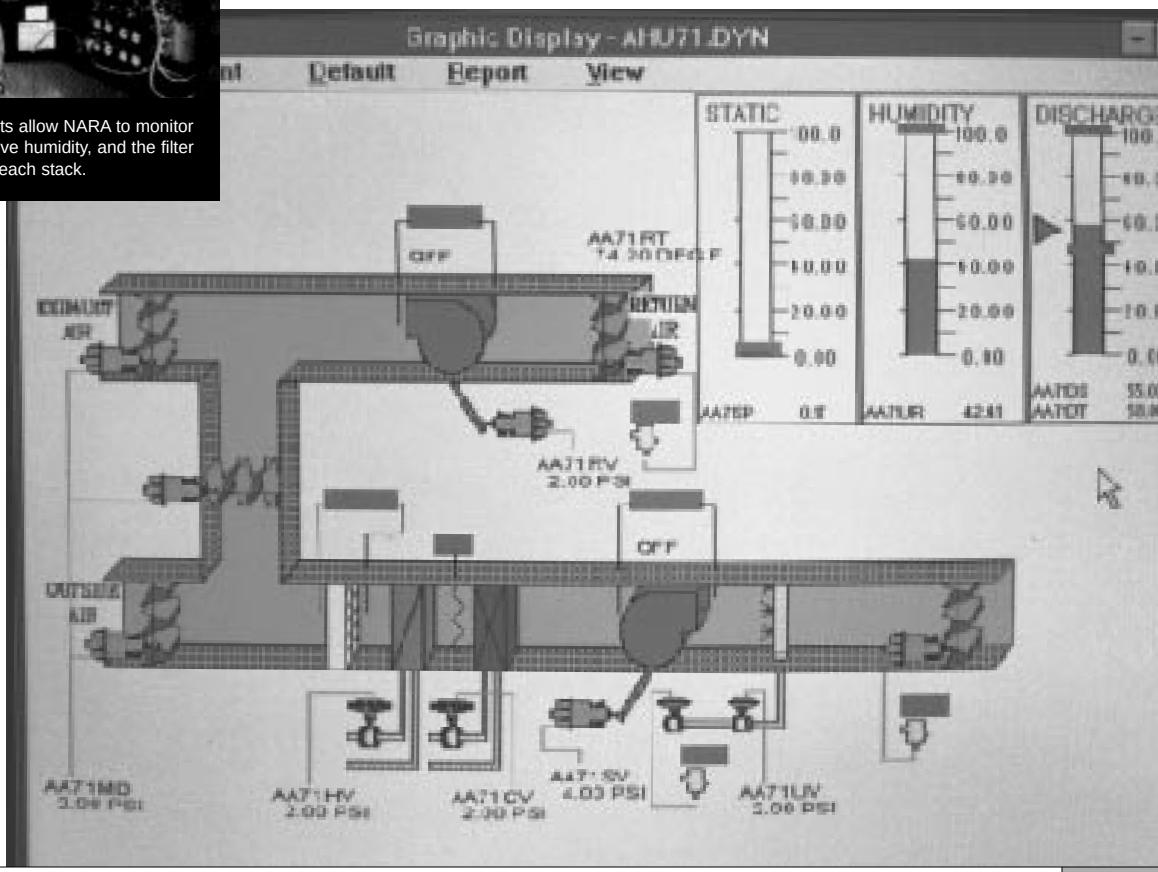
With a total outside air movement of 70,000 cubed feet per minute and a total recirculation of 678,000 cubed feet per minute, the air within the stacks is changed a minimum of six times per hour. To remove the low concentrations of gaseous contaminants in the stacks, two systems were evaluated and deemed acceptable: the conventional 2-inch-deep, impregnated carbon beds and the newer, carbon-impregnated pleated filters. While both systems rely on chemically impregnated carbon as the media, the selected pleated filter system offers the benefit of easier filter replacement. The Archives II stack air handling units, however, are designed to accommodate either system.

There are a total of seven degas filter banks in the outside and stack air handling units. The outside air units have pleated-cartridge degas filters consisting of carbon impregnated with potassium iodide and potassium hydroxide. Filters inside air handling units are impregnated with tromethamine. The degas filters are projected to need replacement every 2 to 3 years. The air handling units are equipped with pressure-sensing devices to detect pressure drops across the particulate filters (indicating saturation and need for replacement). In addition, all stacks are outfitted with a real-time monitoring system to detect low levels of gaseous contaminants and provide early warning of episodic events or filter replacement requirements.

Archival Processing Offices

In order to adhere to strict environmental standards, employee workstations are located outside the stacks. Archival processing offices serve as the work areas for records accessioning, appraisal, arrangement, description, and holdings maintenance activities. While not as complex a system as that found in the stacks, the processing offices are served with cooled and filtered air from the outside air handling units in a manner similar to that used in the stacks.

Air handler control units allow NARA to monitor the temperature, relative humidity, and the filter and damper status in each stack.



Why Special Materials and Finishes?

An electrostatically applied powder coating system was used at each of the plants producing shelving products for Archives II.

The design and construction of Archives II presented an opportunity to provide the best records storage environments permissible using recent technological advances. In addition to focusing on temperatures, relative humidities, and the air filtration system, NARA attempted to identify and eliminate materials that could give off substances that might damage archival records stored in the stacks.

Although many of the decisions as to which materials could or could not be used in the stacks were based on past performance, some choices entailed new materials with no track records. Final selections were guided by prior tests conducted by NARA and other institutions, new tests completed by NARA and the materials' manufacturers, written information supplied by the manufacturers, and, in some cases, NARA's educated guesses.

The guiding principle for approving materials was that they could not be unstable or slow curing. An initial list of prohibited materials was obtained from the Smithsonian Institution and adapted for Archives II. The prohibited materials were

- Asbestos
- Cellulose nitrate-bearing materials, such as cellulose nitrate lacquers and adhesives
- Cellulose acetate fabrics and films
- Polyurethane products including paints, varnishes, and foams
- Acid-curing silicone sealants and adhesives
- Materials containing sulfur in a form that could be released as hydrogen sulfide or mercaptans. These include (but are not limited to) vulcanized rubber and cadmium sulfide pigments. Neoprene is acceptable.
- Pressure-sensitive (tacky) adhesives
- Unstable chlorine-containing polymers, such as polyvinyl chloride and Saran
- Materials that emit formaldehydes (urea/phenol/resorcinol/formaldehyde), including plywood, particle board, and plastic laminates
- Vinyls
- Oil-based paints or varnishes and modified alkyd paints

Although these materials were eliminated from consideration before construction began, other materials that might be used in the stacks had to be tested because their properties were unknown. Commercially available building materials, while stable from the viewpoint of an architect or builder, are not necessarily acceptable to archivists, conservators, or materials scientists. The fact is, most things used to adhere materials to one another or to coat those materials do not dry, or cure, instantaneously; moreover, nearly all give off some gas or vapor while curing. In consultation with design engineers, builders, archivists, chemists, and conservators, the NARA Research and Testing Laboratory considered, tested, and approved on a case-by-case basis a variety of products proposed for use in the construction of the stacks.

Paint

The prohibition on oil-based or alkyd paints stems in part from research done by Eastman Kodak. According to its studies, oil-based paints discolored black-and-white photographic test prints while latex paints did not. Since equivalent water-based latex paints could be used for every application that would have previously employed oil-based paints, NARA had little difficulty specifying latex paints for the walls and ceilings in the stacks. The original building specification for the ceiling pipes and the exterior stack wall metal panels called for an oil-based primer and alkyd second and third coats. An acrylic primer (water reducible) covered by two coats of latex paint was substituted for these areas.

Caulk

The question of which caulk(s) to use in the Archives II stacks was not easily answered. Caulks are used throughout buildings to seal unlike surfaces to one another. In this case, one caulk was used in the assembly of the air handlers; another was applied off-site between the metal panels installed on the exterior stack walls which were caulked in place by a third substance; and a fourth caulk with flame-retardant capabilities was used where essential building services penetrated the walls or ceilings.

NARA's experience in testing gasketing materials for film cabinets resulted in a preference for silicone caulking. However, the staff was not prepared for the large diversity of cure products associated with these caulks. While the best choice was thought to be a caulk with no curing byproducts, none was available for the intended applications. After extensive examination and consultation, NARA decided to use a caulk that cured with the release of alcohol and avoid those that released acetic acid. A caulk that emitted methanol upon curing was used for the metal parts. The caulk selected to adhere the panels to one another was a nonskinning butyl rubber, which was applied prior to shipment and thus evolved solvent off-site. Caulk that evolved acid upon curing was used, however, in the air handling equipment; in this instance, no other alternative presented itself, and the units have filtration systems designed to remove acid gasses.

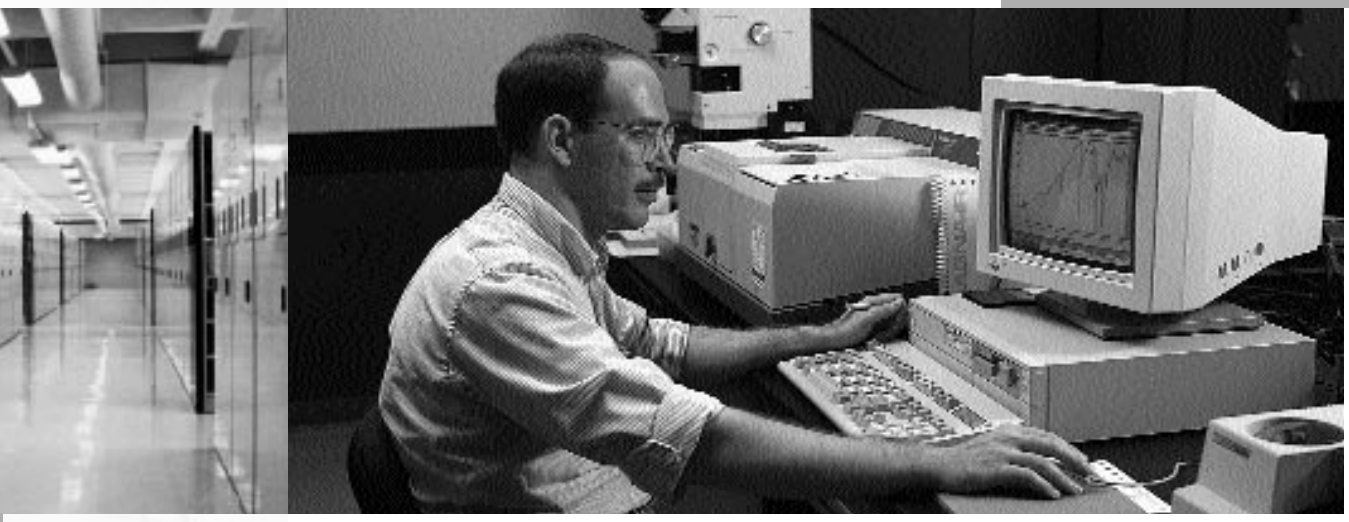
The caulking used for general sealing is a latex caulk containing a flame retardant that would pose a hazard to records in the event of a fire. However, earlier tests showed that this flame retardant remained stable at a high enough temperature that destruction of the records would already be under way by the time the free radicals were released.

Floor Coating

NARA had previously tested floor coatings for the historic National Archives Building and concluded that the less done to a concrete floor the better it was for archival records. Unfortunately, experience also taught the staff that bare concrete floors tended to introduce a good deal of fine dust into the stack environment. Therefore, a search began for an acceptable concrete stack floor coating. After eliminating the originally specified, dry-shake hardener finish due to concerns about the plasticizer and application process, NARA looked at various epoxy floor coatings. After eliminating those containing biocides, solvents, or other objectionable components (such as formaldehyde, acetic acids, and amines), NARA began testing two formulations produced by General Polymers Corporation. As a result of these tests, the agency asked General Polymers to reformulate these two products to eliminate toluene and xylene, which were both potentially damaging to the records. A second reformulation reduced the levels of xylenes and ethylbenzene. The final product, 3505S Special Epoxy Floor Coating, was applied in all stacks and laboratory wet areas after the concrete was shot blasted with an abrasive material so the epoxy would form a strong bond with the concrete.

After much research and testing, NARA chose to cover the concrete floors in all stack areas with a special-formulated epoxy floor coating.

NARA continues to monitor the stacks and track ongoing research on the materials and finishes used in the records storage environment.



Shelving, Cabinet, and Cart Paint

Experience with typical paints used on metal products showed that most cured slowly, remained sticky, or emitted harmful gasses as they dried. Investigations into applications of paint on metal revealed that the electrostatically applied powder coating system (a dry system requiring no organic solvents or drying oils) eliminates the greatest potential hazards to archival materials.

Powder coatings come in a number of finely divided polymer materials such as epoxy powder, polyester triglycidyl isocyanurate (TGIC), polyurethane, and a polyester-epoxy hybrid. NARA used the report by the Canadian Conservation Institute (CCI) on "The Suitability of Powder Coatings for Use in the Museum Environment" as a starting point for specifying paint for the archival storage systems. Experimental findings from the CCI document indicated that powder coatings would be appropriate for use in storage areas for sensitive artifacts. Although all the tested coatings showed no sign of reactivity or degradation, the TGIC best withstood the methyl ethyl ketone (MEK) rub test. NARA expanded CCI's initial test list to reflect the type of archival materials being stored and to encompass a wide range of solvents and insecticides that might be used in the archival storage environment. Using the American Society for Testing of Materials (ASTM) tests, both an independent laboratory and the NARA Research and Testing Laboratory studied shelving coatings.

A summary of the specifications for testing painted metal surfaces follows:

1. Chemical resistance of coating and finishes, which included hardness test (ASTM Method 3363) and the effect of 24-hour contact with the following reagents: cold water, 5% sodium carbonate solution (2 hours with powder-coated finish only), 5% sodium hydroxide in water, 5% thymol in ethyl alcohol, 5% ethyl alcohol in water, chlorinated cleaning solution (e.g., Lysol disinfectant), 3.5% ammonia, and insecticides including pyrethrins, Diazinon, beniocab, propoxur, and resmethrin.
2. Coating softening on exposure to chemical vapors (ASTM Method 3363).
3. Coating stability (ASTM D-4526). Vapors from the sample could not contain aldehydes or low molecular weight organic acids or solvents.
4. Thermogravimetric analysis (TGA). A 100 mg metal sheet containing the cured powder coating sample was placed in a thermogravimetric analyzer and heated from 30 to 700 degrees Celsius at the rate of 10 degrees per minute in a flow of dry air. ~~To be acceptable, the sample had to show a weight loss no greater than 2 percent of the original weight of the coating.~~
5. Coating adhesion (ASTM D-3359). The coating had to meet classification 5B (no flaking).
6. Coating durability (ASTM D-4060). No more than 65 mg of the sample shall be lost after 1,000 cycles of the Tabor Abrasor equipped with CS-10 wheels under a 1 kg load per wheel.

The NARA Research and Testing Laboratory considered, tested, and approved on a case-by-case basis a variety of products proposed for use in the records storage areas.

Test results showed that the epoxy-polyester hybrid outperformed the polyester TGIC coating. The shelving manufacturers only bid powder coatings, so the two tests of most importance in making comparisons were the coating adhesion and coating durability tests. The epoxy-polyester hybrid fared better in the latter test and slightly better in the former. Information from the coating manufacturer, Morton International, showed that compared to TGIC coatings, epoxy hybrids have a smoother finish and more abrasion resistance (due to the epoxy component). Both coatings were softened by a couple of insecticides in the tests. The TGA and Gas Chromatograph with Mass Spectrometric Detector (GC/MS) results were similar for both, except for the

fact that the TGA decomposition peak for the epoxy hybrid showed evidence of the multicomponent nature of that system, while the peak for the polyester TGIC coating was singular and sharp. The basic information obtained from the TGA for both coatings was the same–they both began to lose weight at about 300 degrees Celsius, which indicates that both are quite stable. In comparison, the baked enamel coatings that NARA had previously examined began to lose weight at as low as 200 degrees Celsius.

All shelving products used in the Archives II records storage areas–including the mobile storage system, shelves, map cases, microfilm cabinets, and roller drawers–are covered with the epoxy-polyester hybrid powder coat paint. In addition, the paint is used on all carts, laboratory casework, shelving in laboratories and records processing offices, and file cabinets.

The guiding principal for approving materials was that they could not be unstable or slow curing.

Shelving and Cabinet Materials

NARA required shelving and cabinet manufacturers to have an independent laboratory test their plastics, rubbers, lubricants, adhesives, and any other component of their shelving systems. Rubber bumpers had to be of an acceptable neoprene material. The high-density mobile storage system used shielded bearings containing no lubricants, and silicones and petroleum were prohibited. The aluminum carriages were left uncoated, and the shelving sign holders were either uncoated aluminum or painted with the epoxy hybrid paint.

Other Stack Finishes

The stack light fixtures were left bare aluminum because an acceptable paint could not be found. Stack fire extinguishers are stainless steel and devoid of the familiar red enamel paint.

As a final step in the construction of Archives II, the finished building was allowed to sit empty for several months to allow for the venting of gasses. Once the air filtration system was operational, it removed any gasses left in the stack environment.

With Archives II, NARA has provided the best archival storage environment that current science and technology can provide. The archivists, conservators, and chemists continue to monitor the stacks and track ongoing research on the materials and finishes used in the records storage environment.

Why Mobile Storage?

Archives II holds over 2 million cubic feet of archival materials, including paper records, photographs, maps, drawings, motion picture film, and electronic records. To store and protect these documents while still making them easily accessible to researchers, NARA installed the world's largest high-density mobile storage system. A number of factors led to this decision–the primary reason being the need for maximum storage density to address current and future storage requirements. The selection was also influenced by site restrictions, financial considerations, and aesthetic concerns which also limited the overall size of the new facility. NARA wanted the new building to be as cost-efficient as possible while still fulfilling stringent quality requirements and providing environmentally sound records storage.

Given these restrictions, high-density mobile shelving, or compact shelving, offered the best solution. Traditional stationary shelving would have required a building of nearly 2.7 million square feet–in other words, one too large and too expensive.

Capacity and Storage Efficiency

The mobile storage system, developed and installed by H&S Constructors, a joint venture of Spacesaver Corporation and Harnischfeger Engineers, Inc., provides maximum space efficiency and storage capacity. The system consists of wheeled carriages that can accommodate a variety of storage housings. The carriages run on tracks and compact together to eliminate unnecessary aisles. Only one "movable" aisle is needed for each module of mobile carriages, so at least twice as much material can be stored in the same space as with fixed shelving. In addition to conventional storage containers, the mobile system houses map cases for storing oversized records; microform cabinets for storing microfilm, microfiche, and aperture cards; and roller drawers for storing photographic negatives.

Electric operation was chosen for the mobile shelving system because of its ability to power heavily loaded or extra-long carriages.

All stacks are equipped with an electric, high-density mobile storage system provided by H&S Constructors, a joint venture of the Spacesaver Corporation and Harnischfeger Engineers, Inc.

The system compacts almost 2 million cubic feet of storage capacity into an area of 691,572 square feet. The 2,000 carriages roll on more than 80,000 feet (over 15 miles) of rail recessed in the concrete floor.

Protection of Collections and Users

To protect against long-term damage, all mobile system components and finishes were tested to ensure that they were stable, inert, chemically resistant, and unable to off-gas harmful chemicals. As part of a state-of-the-art fire protection system, the mobile units feature a special "fire park" mode controlled by the building's fire management system. Should a fire break out, 4- to 6-inch flue spaces are automatically created between the carriages (or ranges) so sprinkler water flows more efficiently, and the flames have far less chance of "jumping" across aisles. (This same mode is used in the evenings to provide fire protection and allow air circulation through the collections.) The building also has quick-response sprinklers and smoke detectors to set off the alarms and sprinklers at the first threat of smoke or fire.

Adequate load-bearing capacity was provided for the floors in each records storage area. To obtain this strength, the architects specified two-pour, steel-reinforced floors. The slab features a special two-way concrete joist design similar in appearance to a waffle.

To ensure durability, all components of the mobile system—including the floors, rails, mobile carriages, stationary platforms, wheels, drive shafts, and motors—had to satisfy strict criteria for strength, rigidity, resistance to seismic forces, and conformance to deflection requirements. Similar standards also apply to the shelving, map cases, microfilm cabinets, roller drawers, and art racks. In some cases, these criteria exceeded the current industry and institutional standards.

The building design took into account the safety of the users as well as stored materials. Aisle entry sensors detect a user entering an aisle and lock the system. An infrared optical safety sweep system detects objects or people in its path and upon detection will automatically shut down the system. For added security, the mobile system's electric controls are tied into the building management control system, and storage modules in restricted areas require security cards and access codes to prevent unauthorized use.

Structural requirements for the shelving in Archives II exceed industry standards. The shelving system features 18-gauge, four-post steel shelving and 11-gauge steel shelf supports for maximum stability.

Electric Operation

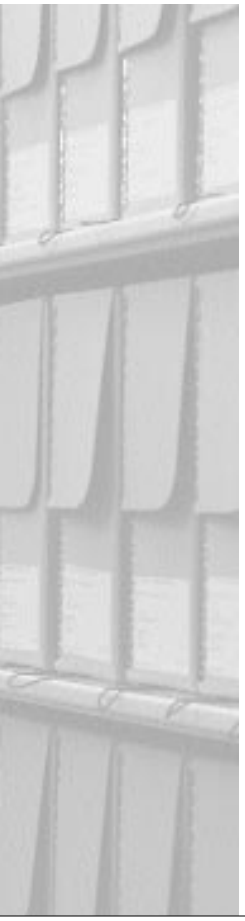
Electric operation was chosen for the mobile shelving system because of its efficiency in powering heavily loaded or extra-long carriages. Carriages range in length from 13 to 70 feet. NARA specified DC electric motor drives and controls for their smooth and controlled acceleration and deceleration; this is especially important for moving collections that are delicate, fragile, or sensitive to vibration.

System Design Considerations

- *Floors.* Adequate load-bearing capacity was provided for the floors in each records storage area. The floors are designed to support 350 pounds per square foot with a maximum deflection rate of L/750, where L is the dimension from center line to center line of the columns. To obtain this strength, the architects specified two-pour, steel-reinforced floors. The slab features a special two-way concrete joist design similar in appearance to a waffle. Metal reinforcing mesh was placed over the slab before the second pour for additional strength, and upon the completion of each floor, the concrete was sealed with an approved epoxy-type sealer.
- *Rails.* For the system to operate properly, it is critical for the rails to be precisely level and exactly parallel to each other. Problems were avoided in Archives II by a number of measures. Fully adjustable leveling screws were used to ensure accurate installation and long-term reliability. The rails were anchored to the floor with standard, screw-type concrete fasteners. The rails feature interlocking tongue-and-groove joints to assure proper alignment and load transfer as well as smooth and easy carriage movement. Once leveled and anchored, the rails were set in a thicker than normal, full-length bed of high-strength, hydraulic, non-shrinking grout. For added protection during construction, the rails were covered with inverted 22-gauge steel channels after the second pour of the floor.

- *Mobile Carriages.* The carriages feature a welded aluminum uniframe construction that provides a high strength-to-weight ratio; prevents binding, racking, and misalignment; and eliminates the need for fasteners that can loosen or break. The design carries the specified weight of records or other materials stored on it without distortion and evenly transfers weight onto the wheels. The standard carriages have a load-bearing capacity of 1,000 pounds per linear foot of carriage length, while the largest carriages (for map cases) can bear 2,000 pounds per linear foot. The system features 5-inch case-hardened steel wheels that have been ground and balanced for smooth operation; permanently lubricated and shielded ball bearing for long, maintenance-free life; and a steel drive shaft with keyway couplings to eliminate wear and ensure long-term system reliability.
- *Shelving.* Structural requirements for the shelving in Archives II exceed current industry standards. To attain the deflection requirement of L/320, the system features heavy-duty, 18-gauge, four-post steel shelving and 11-gauge steel shelf supports for maximum stability. The system contains more than 80,000 single-faced sections of four-post shelving for textual records storage, more than 1,600 sections for cold storage, and more than 500 sections for light storage for a total of 520 miles of shelving. Mobile systems in cold storage feature special open, through-style shelving and stainless-steel wire racks that have been designed without any sharp, exposed metal edges. Also provided are sliding reference shelves to provide the users with a surface to place and review materials.

The carriages feature a welded aluminum uniframe construction, which provides a high strength-to-weight ratio; prevents binding, racking, and misalignment; and eliminates the need for fasteners that can loosen or break.



- *Map Cases.* Archives II contains the world's largest installation of map cases (in excess of 10,000) on mobile storage units. The double-wide carriages used to store the map cases range from 16 feet long (holding up to 30 cases back to back) to 64 feet long (140 cases). Each map case stored on the mobile system is 15⅜ inches high, 44½ inches deep, and from 55 to 64 inches wide. The map cases were stacked three high upon installation, but the system's modular design enables cases to be added up to five high, as needed. All carriages, including those containing map cases, have identical, full-length face panels for a uniform appearance.
- *Art Racks.* Archives II has two mobile art rack systems, one with 24 screens and the other with 15 screens, to store framed maps and other records that are best stored by hanging from a rack. The systems are moved manually and "nest" to store twice as much in the same space as fixed racks.
- *Electrical Systems.* The new-generation controls used in the system at Archives II allow every function to be programmed onsite; they are also interfaced into the building management system for added flexibility. Electronic controls for the DC motors provide smoother starting, operation, and stopping. A sequential movement system protects stored materials by preventing the carriages from touching one another and minimizing vibration. Power for the systems is delivered by an overhead pantograph. A portable, battery-operated power pack provides a temporary means of operating the system during a power outage.
- *Lighting.* Building lights were installed perpendicular to the carriages, and the system is tied into lighting interface boxes within the mobile storage system. When a shelving module is accessed, only the lights above that module are turned on, thus helping conserve electricity. Additional lighting, not tied into the mobile system, is located in the main aisles of each stack area.

Why Fire Protection?

To achieve fire protection for the archival records stored at Archives II, a unique systems interface was developed between the fire sprinkler system, fire detection and alarm system, and mobile compact shelving control system.

Flue spaces between the carriages reduce the time it takes to put out a fire and the amount of fire damage in a mobile shelving system.

Protecting the Stacks

The decision to use high-density mobile shelving in the stacks of Archives II necessitated new design concepts for fire protection. Previous fire tests had shown that automatic sprinkling systems (the most reliable fire protection tool) were inadequate for safeguarding documents in this type of shelving system.

The following objectives were chosen to achieve improved fire protection for archival stack storage:

1. Limit sources of ignition.
2. Provide early warning of incipient fires.
3. Minimize the exposure any archival record storage area has to fire in another part of the building.
4. Improve the ability of the sprinkler systems to control and extinguish fires in compact shelving.

The first three objectives were readily incorporated into the overall design of the building using smoke detection systems and fire-rated enclosures.

To improve the ability of the sprinklers to cover the records stored in mobile shelving, NARA adapted a number of approaches. Before authorizing a final approval of the mobile shelving system, NARA had Underwriters Laboratories (UL) of Northbrook, IL conduct a series of fire tests on the mobile units. Four findings emerged from the tests:

1. During a fire alarm and at night, the mobile system should leave 4- to 6-inch spaces between the carriages to serve as flues, which reduce the time it takes to put out a fire and the amount of fire damage. The greater the flue space, the sooner a fire is detected and the sprinklers activated. Once the sprinklers are activated, the spaces allow the water to cascade down the front of the shelves and prevent flames from "jumping" across the aisles to adjacent carriages.
2. Early suppression fast response sprinklers with "quick-response," heat-activated sensors on the ceiling above the mobile system modules provide greater protection. In the UL tests, sprinkler heads rated at 165 degrees Fahrenheit responded soon enough to put out the fire and permit salvage of a sizable portion of the burning records.
3. Smoke detectors provide valuable early warning, especially when carriages are compacted.
4. Fires in mobile shelving systems can be contained within a single module if the sprinkler system is activated. This is an essential requirement for the overall fire safety of this facility.

Accordingly, the mobile shelving system at Archives II is configured so that when a fire alarm goes off during operating hours, the building control system signals the mobile carriages to go into the "fire park" mode. A red light blinks on each carriage, and the carriages automatically move to create uniform flue spaces of approximately 5 inches and then lock in place. For added safety, the "fire park" mode does not override safety sensors–the carriages will not move if there is a person or object in their path. When the fire signal ends, the carriages return to their ready state but stay in the "fire park" mode. As an additional protection measure, the units are programmed to assume this same configuration after hours. Carriages in the "fire park" or "night park" mode remain so until reactivated by the building management system.

Other fire protection features include

- Wet pipe automatic sprinkler system with 0.30 gallons per minute square foot density over 1,500 square feet; quick response sprinklers with nominal 160 degrees Fahrenheit temperature
- Complete area smoke detection with addressable smoke detectors and remote graphic annunciators outside each stack area
- Two-hour fire-rated separation between each stack area and adjacent spaces
- Interface with heating, ventilating, and air-conditioning system to permit smoke removal
- Manual hose outlets at the entrance to each stack area

Sprinkler Protection in Non-Stack Areas

While the stack areas are protected by a "specialized" sprinkler system, the remainder of the building is protected with a combined sprinkler/standpipe system of various design densities as required by the Standard for the Installation of Sprinkler Systems, NFPA 13. Occupancy classifications in the non-stack areas of the building include

Light Hazard

- Offices
- Archival processing offices
- Day care facility
- Atrium spaces
- Lobbies and circulation spaces
- Computer rooms
- Cafeteria seating area
- Auditorium seating area

Ordinary Hazard

- Mechanical equipment areas
- Loading dock
- Storage rooms
- Cafeteria service areas
- Auditorium stage and proscenium

The sprinkler system is zoned to match the fire alarm system zones by floor and area of the building. NARA decided that where possible, the sprinkler zones would be supplied with water from a single riser; this minimizes the amount of time required to shut off a zone after a sprinkler activation (from a fire or from sprinkler damage) and limits the amount of residual water damage.

Because the items stored at Archives II are "one-of-a-kind" and cannot be replaced, a backup fire pump system was provided in case the first pump failed or was out of service for maintenance.

Fire Pumps

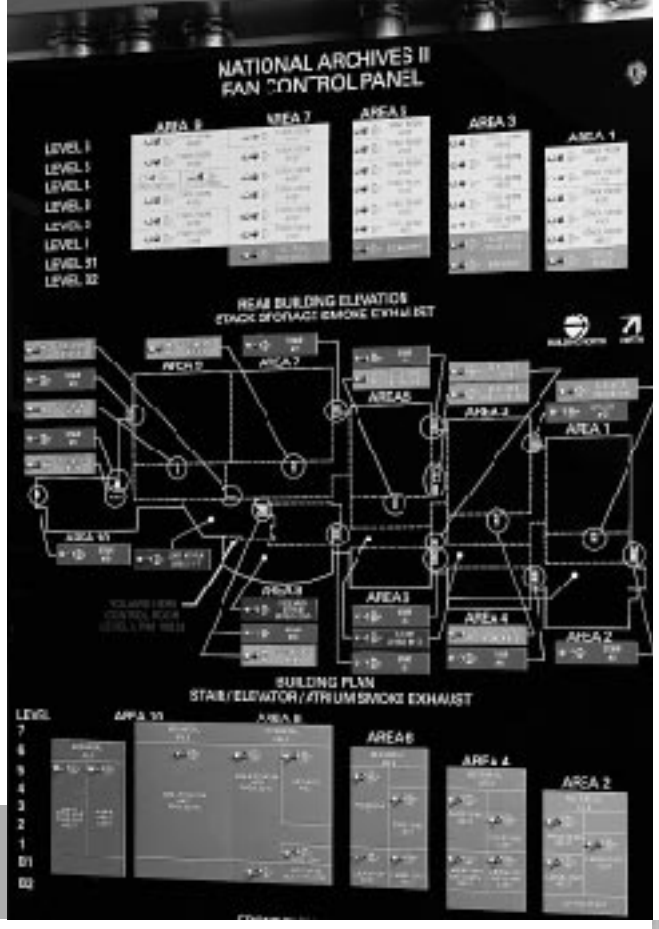
Due to the height of the building and the hydraulic demand of the various sprinkler/standpipe systems, the municipal water supply required supplemental pressure to meet the design densities. Because the items stored at Archives II are "one-of-a-kind" and cannot be replaced, a backup pump was provided in case the first pump failed or was out of service for maintenance.

Fire Alarm System

With almost 2,000 smoke detectors and 500 other initiating points, the fire alarm system design had to be capable of processing vast amounts of information in order to monitor the fire detection devices and interface with the building automation, security, and elevator recall systems.

Several factors demanded that a building this size have an intelligent, addressable fire alarm system. The first important factor was the smoke detector maintenance and testing requirements required by the building codes. It was important to choose a system that featured a simplified and more cost-effective procedure for conducting mandatory testing and sensitivity checks. With the intelligent, addressable system, each device on the system reports individually with a unique address, and the fire detection sensors–heat and smoke–have no hard self-contained alarm set point. The system also checks each sensor's sensitivity from the control panel or central control unit. These capabilities dramatically reduce labor and associated costs.

The second factor was the multiple interface requirements needed between the fire alarm system and the building automation system for smoke removal, a special elevator recall system, and the extensive building security systems. In addition, original building program requirements included a future 25-percent build-



The fan control panel allows the fire department to manually control the smoke removal system.

ing expansion capability. A software-driven, intelligent, addressable fire alarm system is easier to expand and integrate with the existing system.

Detection

Although Archives II is fully outfitted with sprinklers, the extensive archival collections and atrium design demanded the addition of almost 2,000 smoke detectors. Complete automatic smoke detection is provided in each of the atria, which include the entrance atrium, three stack area atria, and the research atrium; each of the stacks; and throughout the day care center.

In accordance with building codes, ionization smoke detector sensors are provided at the top of each atrium. These atria are separated from the rest of the building with 1-hour fire-resistant construction. Adjacent corridors, open to the atrium, are also provided with smoke detection. Within the stack areas, ionization-type and photoelectric-type detectors are alternated on 25-foot spacings. Stack areas containing magnetic tape, film media, or a great deal of plastics are designed with ionization-type detectors only and also are spaced on 25-foot centers. Smart graphic annunciators are located at each stack entrance, with signals multiplexed from the fire data-gathering panel. Annunciator lights are provided for each device, including water flow. Information regarding the actual devices in alarm is available in the fire control room near the entrance lobby, the security office, and the fire data-gathering panels.

Data-processing computer rooms are provided with ionization-type smoke detectors located at the ceiling. Photoelectric-type detectors are provided under the raised floor. Those at the ceiling have conventional spacing of 900 square feet. Detectors beneath the floor are reduced to 12-foot centers (150 square feet) due to air velocity factors.

The fire alarm evacuation system is used for general evacuation and uses bell/strobe appliances. In addition to conventional strobe visual warning signals, supplementary visual alarm signal rotating beacons are located within the stack areas to help alert the hearing impaired.

A fire control room is provided in close proximity to the first-floor lobby entrance. This serves as the main center for coordinating a fire emergency response.

Smoke Removal

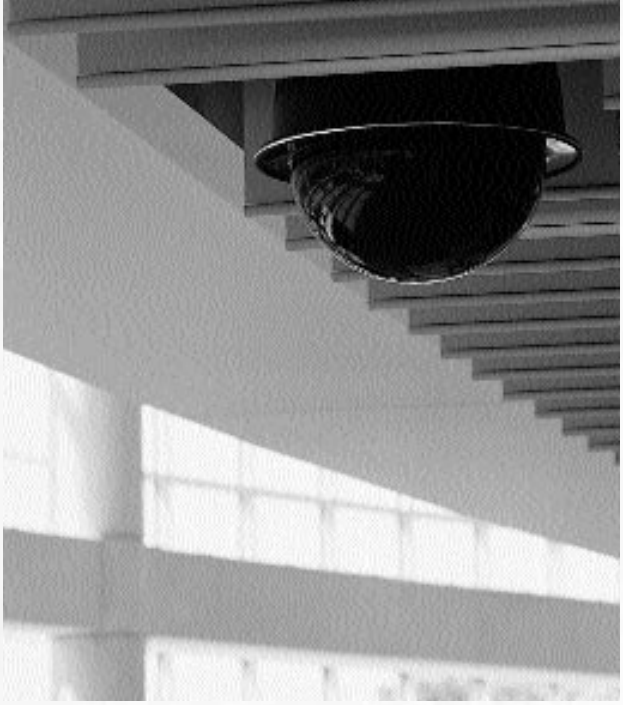
The Archives II building has its own central heating and cooling plant. A smoke removal sequence was included in the control portion of the air handling system design, with the building automation system controlling fans and dampers. In addition to the automatic controls, full manual control of the smoke purge system is provided in the fire control room. This is accomplished by a dedicated "manual fan control panel" with control switches. The color-coded panel shows the building in plan and elevation view with the switches located in the areas or close by to help select the proper activation.

In the stacks, the dedicated heating, ventilating, and air-conditioning (HVAC) system supply air at the ceiling and exhaust it low near the floor. Using the HVAC system for smoke removal without compromising emergency egress required additional dampering and relays. Dedicated smoke-removal fans are used in the stacks and provide approximately eight air exchanges per hour. While one stack is in smoke removal, the others go into a recirculation mode that puts them at slightly higher pressure to prevent smoke migration.

During a fire alarm and at night, the mobile system will leave 4- to 6-inch spaces between the carriages to serve as flues, which reduce the time it takes to put out a fire and the amount of fire damage.

Why the Need for Security?

NARA is entrusted with safeguarding the permanently valuable records of the Federal Government. Archives II holds a wide variety of archival materials, including paper records, maps and drawings, photographs, films, and electronic records. Some of these contain sensitive/classified information; all are irreplaceable. Hence the need for security–in this instance a state-of-the-art, flexible, and cost-effective security system designed to protect NARA staff and archival records alike from such threats as theft, unauthorized disclosure of classified information, sabotage, and espionage.



Cameras are one of the security devices used by NARA staff in the research rooms to monitor researchers.

Security Design

The design of Archives II attempts to strike a balance between the public's right to access historical records and the need to protect these documents. The security controls were carefully designed so they would not unduly restrict the archival and research processes. The basic overall approach is to establish secure zones within the facility that limit access to authorized personnel only. Researchers and the general public are separated from archives storage and operations via an architecturally isolated "security envelope." This lets them freely visit areas such as the cafeteria and the auditorium and conduct research without being burdened by extra security procedures.

- *Public Areas*. The cafeteria, convenience shop, and researcher registration office are located off the lobby and are easily reached by all visitors without a security check. The auditorium, meeting rooms, and researcher locker room are located one floor below the lobby and are accessed by an elevator and staircase located in the lobby. Other areas of the building cannot be accessed without going through a security checkpoint.
- *Offices*. Visitors must pass through a security checkpoint before entering the administrative areas of Archives II.
- *Non-public Areas*. Entrance to the records storage areas (stacks), archival processing offices, and laboratories is controlled by electronically activated security doors, which use card reader sensors for access.
- *Steny H. Hoyer Research Center*. All research of archival records takes place in the research center. Protection of these valuable records is largely achieved through continual monitoring by the Archives II staff during the research process. The only public entrance/exit is a security gate manned by one or more security guards. After entering the center from the lobby, researchers are free to visit any research room on floors two through six. Visitors must have their researcher cards scanned by an automatic reader to log in and out of the center or individual research room.

All researchers are required to have a researcher card and must have checked all belongings in the locker room before entering the research center. Loose notes brought into the center are stamped and approved by the staff, and computers and film equipment are examined by the security guards. NARA provides researchers with marked paper, cards, pencils, and gloves; these can be found at an information center located in each research room.

To enhance monitoring of research activities, visual obstructions in the research rooms have been kept to a minimum. Security in the rooms is maintained by specially trained NARA staff. Each room contains surveillance cameras, a central reference desk and monitor desks situated so that all researchers can be observed by the staff. Copy machines are located next to the monitor desks so the staff can watch researchers making copies of original records. Team research rooms in the textual research room are equipped with glass walls for easy observation. Reference copies of videotapes are encoded for easy detection by antitheft devices located at the exit.

Security Systems

Security at Archives II is achieved by physical security construction, electronic security systems, continuous personnel access control, 24-hour guard service, and a reserve guard force. The security operation is monitored by NARA security staff.

Physical construction of records storage areas includes heavy-duty hardware, metal doors, masonry fire walls, concrete floors and ceilings, and door-locking devices. There are no windows in the stack areas.

Electronic security systems include a security management system, which monitors intrusion detection and access control; the system is located in a central security console in the security control room. This console includes a computerized security control unit to monitor intrusion alarms and access, closed-circuit television (CCTV) monitors, a videotape recorder, and a master intercom station. Backup fire alarm equipment is also located at the main security console. The security management system provides access control for designated security doors using card readers, provides alarm monitoring, and contains software and hardware features to support these functions.

The CCTV system monitors specific locations, including entrances, high-security stacks, the research center, and emergency exits.

The access control system consists of security card readers that communicate with the security management system. Card readers provide controlled access for entry at the employee entrances, all records storage areas, and other sensitive/secure locations.

The access control system consists of some 140 security card readers that interface with the security management system. Card readers provide controlled access for entry at employee entrances, records storage areas, processing offices, laboratories, the loading dock, and other sensitive/secure locations. The card readers maintain the separation between NARA staff and the general public and monitor access into all controlled areas.

The CCTV system monitors specific locations, including entrances, high-security stacks, the research center, and emergency exits. Monitors are located at the security control console, loading dock, lobby security desk, and monitor desks in the research center.

The security intercom system is a two-way network used for communication between the security control room and NARA personnel. Call boxes are located at entrances to stacks, processing offices, and stairwells, as well as in other sensitive locations. The call box permits immediate contact with security officers in the event of an emergency. In locations of high security, call boxes operate in conjunction with CCTV surveillance cameras.

A 24-hour guard service protects the building and staff and monitors the security management system located in the security control room. The console pictured here includes a security computer that monitors intrusion alarms and access, closed-circuit television monitors, a videotape recorder, and a master intercom station.

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National Archives and Records Administration
Technical Information Paper Number 13
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AEROSPACE STANDARD

SAE AS9100
Technically equivalent to AECMA prEN 9100

Issued 1999-11

Quality Systems
- Aerospace -
Model for Quality Assurance
in Design, Development, Production, Installation and Servicing

FOREWORD

In December 1998, the Aerospace Industry had established the International Aerospace Quality Group (IAQG) with the purpose of achieving significant improvements in quality and reductions in cost throughout the value stream.

This organization, with representation from Aerospace companies in Americas, Asia and Europe and sponsored by SAE, SJAC, and AECMA has agreed to take responsibility for the technical contents of this standard.

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1. SCOPE:

This standard includes ASQ 9001:1994 quality system requirements and specifies additional requirements for the quality system of the aerospace industry.

For those not involved in design activities (Ref. ASQ 9002), 4.4 is not applicable.

It is emphasized that the quality system requirements specified in this standard are complementary (not alternative) to the contractual and applicable law and regulatory requirements.

2. NORMATIVE REFERENCES:

The following standard contains provisions which, through reference in this text, constitute provisions of this document. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC (***International Electrotechnical Commission***) and ISO (***International Organization for Standardization***) maintain registers of currently valid International Standards.

ANSI/ISO/ASQC Q9001:1994; Quality Systems - Model for Quality Assurance in Design, Development, Production, Installation and Servicing (a word-for-word equivalent to ISO9001) has been reproduced in this document with the permission of the American Society for Quality. The complete standard can be obtained from the American Society for Quality, 611 E. Wisconsin Ave., Milwaukee, WI 53202. Copyright remains with the American Society for Quality.

ISO 8402:1994 Quality management and quality assurance - Vocabulary
ISO 9001:1994 Quality systems - Model for quality assurance in design, development, production, installation and servicing

Notes are for guidance only and are not a part of the requirements of the document.

NOTE 1: For informative references, see Annex A.

3. DEFINITIONS:

For the purposes of this document, the definitions are given in the International Standard ISO 8402 and the following definitions apply.

3.1 PRODUCT:

Result of activities or processes

NOTES:

2: A product may include service, hardware, processed materials, software or a combination thereof.

3: A product can be tangible (e.g., assemblies or processed materials) or intangible (e.g., knowledge or concepts), or a combination thereof.

4: For the purposes of this document, the term " product " applies to the intended product offering only and not to unintended " by-products " affecting the environment. This differs from the definition given in ISO 8402.

3.2 TENDER:

Offer made by a supplier in response to an invitation to satisfy a contract award to provide product.

3.3 CONTRACT:

Agreed requirements between a supplier and customer transmitted by any means.

3.4 KEY CHARACTERISTICS:

The features of a material or part whose variation has a significant influence on product fit, performance, service life, or manufacturability.

4. QUALITY SYSTEM REQUIREMENTS:

NOTE: ***This clause reproduces[1] clause 4 of ASQ 9001:1994. Additional International Aerospace Industry requirements are shown in italics and bold.***

1. With the permission of the American Society for Qualtiy (ASQ). The complete standard may be obtained from ASQ, 611 E. Wisconsin Ave., Milwaukee, WI 53202.

4.1 Management Responsibility:

4.1.1 Quality Policy: The supplier's management with executive responsibility shall define and document its policy for quality, including objectives for quality and its commitment to quality. The quality policy shall be relevant to the supplier's organizational goals and the expectations and needs of its customers.

The supplier shall ensure that this policy is understood, implemented and maintained at all levels of the organization.

4.1.2 Organization:

4.1.2.1 Responsibility and Authority: The responsibility, authority and the interrelation of personnel who manage, perform and verify work affecting quality shall be defined and documented, particularly for personnel who need the organizational freedom and authority to:

a. initiate action to prevent the occurrence of any nonconformities relating to the product, process and quality system;

b. identify and record any problems relating to the product, process and quality system;

c. initiate, recommend or provide solutions through designated channels;

d. verify the implementation of solutions;

e. control further processing, delivery or installation of nonconforming product until the deficiency or unsatisfactory condition has been corrected.

4.1.2.2 Resources: The supplier shall identify resource requirements and provide adequate resources, including the assignment of trained personnel (see 4.18), for management, performance of work and verification activities including internal quality audits.

4.1.2.3 Management Representative: The supplier's management with executive responsibility shall appoint a member of the supplier's own management who, irrespective of other responsibilities, shall have defined authority for:

a. ensuring that a quality system is established, implemented and maintained in accordance with this document, and,

b. reporting on the performance of the quality system to the supplier's management for review and as a basis for improvement of the quality system.

NOTE 5: The responsibility of a management representative may also include liaison with external parties on matters relating to the supplier's quality system.

The Management representative shall have the necessary authority and organizational freedom to resolve matters pertaining to quality.

4.1.2.4 Process Performer: ***Suppliers having a quality assurance activity performed by an individual process performer (e.g., operator, buyer, planner) shall have procedures that define the specific tasks and responsibilities that are authorized and the corresponding requirements and training necessary to perform those tasks.***

4.1.3 Management Review: The supplier's management with executive responsibility shall review the quality system at defined intervals sufficient to ensure its continuing suitability and effectiveness in satisfying the requirements of this document and the supplier's stated quality policy and objectives (see 4.1.1). Records of such reviews shall be maintained (see 4.16).

4.2 Quality System:

4.2.1 General: The supplier shall establish, document and maintain a quality system as a means of ensuring that product conforms to specified requirements. The supplier shall prepare a quality manual covering the requirements of this document. The quality manual shall include or make reference to the quality system procedures and outline the structure of the documentation used in the quality system.

NOTE 6: Guidance on quality manuals is given in ISO 10013.

Other Quality System requirements imposed by the applicable Regulatory Authorities shall be included or referenced in the Quality System documentation.

4.2.2 Quality System Procedures: The supplier shall:

a. prepare documented procedures consistent with the requirements of this document and the supplier's stated quality policy;

b. effectively implement the quality system and its documented procedures;

c. ***ensure that quality system procedures are readily accessible to personnel who are responsible for performing work in conformance to requirements, and to customer and/ or regulatory authorities representatives.***

For the purposes of this document, the range and detail of the procedures that form part of the quality system shall be dependent upon the complexity of the work, the methods used, and the skills and training needed by personnel involved in carrying out the activity.

NOTE 7: Documented procedures may make reference to work instructions that define how an activity is performed.

4.2.3 Quality Planning: The supplier shall define and document how the requirements for quality will be met. Quality planning shall be consistent with all other requirements of a supplier's quality system and shall be documented in a format to suit the supplier's method of operation. The supplier shall give consideration to the following activities, as appropriate, in meeting the specified requirements for products, projects or contracts:

a. the preparation of quality plans;

b. the identification and acquisition of any controls, processes, equipment (including inspection and test equipment), fixtures, resources and skills that may be needed to achieve the required quality; ***the design, manufacture, and use of tooling so that variable measurements can be taken, particularly for key characteristics;***

c. ensuring the compatibility of the design, the production process, installation, servicing, inspection and test procedures and the applicable documentation;

d. the updating, as necessary, of quality control, inspection and testing techniques, including the development of new instrumentation;

e. the identification of any measurement requirement involving capability that exceeds the known state of the art, in sufficient time for the needed capability to be developed;

f. the identification of suitable verification at appropriate stages in the realization of product; ***the identification of in-process verification points when adequate verification of conformance cannot be performed at a later stage of realization;***

g. the clarification of standards of acceptability for all features and requirements, including those which contain a subjective element;

h. the identification and preparation of quality records (see 4.16);

i. ***the identification and selection of subcontractors;***

j. ***the establishment of appropriate process controls and development of control plans where key characteristics have been identified;***

k. ***the identification of material, processes and services to support operation and maintenance of the product.***

NOTE 8: The quality plans referred to [see 4.2.3a)] may be in the form of a reference to the appropriate documented procedures that form an integral part of the supplier's quality system.

4.2.4 Configuration Management: ***The supplier shall establish, document and maintain a configuration management process appropriate to the product.***

NOTE: ***Guidance on configuration management is given in ISO 10007.***

4.3 Contract Review:

4.3.1 General: The supplier shall establish and maintain documented procedures for contract review and for the coordination of these activities.

The supplier shall also establish and maintain documented procedures for tender review and for the coordination of these activities.

4.3.2 Review: Before submission of a tender, or the acceptance of a contract or order (statement of requirement), the tender, contract or order shall be reviewed by the supplier to ensure that:

a. the requirements are adequately defined and documented ; where no written statement of requirement is available for an order received by verbal means, the supplier shall ensure that the order requirements are agreed before their acceptance;

b. any differences between the contract or order requirements and those in the tender are resolved;

c. the supplier has the capability to meet the contract or order requirements;

d. ***risk associated with new technology and/or short delivery time scale have been evaluated.***

4.3.3 Amendment to a Contract: The supplier shall identify how an amendment to a contract is made and correctly transferred to the functions concerned within the supplier's organization.

Contract review requirements shall also apply to contract amendment.

4.3.4 Records: Records of contract reviews shall be maintained (see 4.16).

NOTE 9: Channels for communication and interfaces with the customer's organization in these contract matters should be established.

4.4 Design Control:

4.4.1 General: The supplier shall establish and maintain documented procedures to control and verify the design of the product in order to ensure that the specified requirements are met.

The responsibilities and authorities for the approval of the design data shall be defined.

When the supplier subcontracts design or development activities, the supplier shall control the subcontracted activity consistent with the requirements of paragraph 4.4.

4.4.2 Design and Development Planning: The supplier shall prepare plans for each design and development activity. The plans shall describe or reference these activities, and define responsibility for their implementation. The design and development activities shall be assigned to qualified personnel equipped with adequate resources. The plans shall be updated, as the design evolves.

4.4.2.1 Design and Development Management Planning: ***The supplier shall plan the different phases used to carry out the design and development, in respect of the organization, task sequence, mandatory steps, significant stages and method of configuration control.***

The supplier shall give consideration to the following activities as appropriate:

- ***structure the design effort into significant elements according to the complexity,***

- ***for each element analyze the tasks and the necessary resources for its design and development. (This analysis shall consider an identified responsible person, design content, planning constraints, and performance conditions).***

4.4.2.2 Reliability, Maintainability, Safety: ***The different design and development tasks to be carried out shall be defined according to specified safety or functional objectives of the product in accordance with customer and/or regulatory authority requirements.***

4.4.3 Organizational and Technical Interfaces: Organizational and technical interfaces between different groups which input into the design process shall be defined and the necessary information documented, transmitted and regularly reviewed.

4.4.4 Design Input: Design input requirements relating to the product including applicable statutory and regulatory requirements shall be identified, documented and their selection reviewed by the supplier for adequacy. Incomplete, ambiguous or conflicting requirements shall be resolved with those responsible for imposing these requirements.

Design input shall take into consideration the results of any contract review activities.

The input data to the design shall be defined and documented in terms of functional requirements.

In the case of a product requiring design and development planning the supplier shall establish the input data specific to each element and shall review to ensure consistency with requirements.

4.4.5 Design Output: Design output shall be documented and expressed in terms that can be verified and validated against design input requirements.

Design output shall:

a. meet the design input requirements;

b. contain or make reference to acceptance criteria;

c. identify those characteristics of the design that are crucial to the safe and proper functioning of the product (e.g., operating, storage, handling, maintenance and disposal requirements).

Design output documents shall be reviewed before release.

All pertinent data required to allow the product to be identified, manufactured, inspected, used and maintained shall be defined by the supplier e.g.:

- drawings, part lists, specifications,

- a listing of those drawings, part lists, specifications, necessary to define the configuration and the design features of the product,

- information on material, processes, type of manufacturing and assembly of the product necessary to ensure the conformity of the product.

4.4.6 Design Review: At appropriate stages of design, formal documented reviews of the design results shall be planned and conducted. Participants at each design review shall include representatives of all functions concerned with the design stage being reviewed as well as other specialist personnel, as required. Records of such reviews shall be maintained (see 4.16).

Consideration shall be given to:

- ***the validity of design in relation to the objectives of the design stage,***
- ***actions which need to be taken in the event of any identified deviation,***
- ***decision necessary for progression to the next stage.***

4.4.7 Design Verification: At appropriate stages of design, design verification shall be performed to ensure that the design stage output meets the design stage input requirements. The design verification measures shall be recorded (see 4.16).

NOTE 10: In addition to conducting design reviews (see 4.4.6), design verification may include activities such as:

- performing alternative calculations,
- comparing the new design with a similar proven design, if available,
- undertaking tests and demonstrations, and
- reviewing the design stage documents before release.

4.4.8 Design Validation: Design validation shall be performed to ensure that product conforms to defined user needs and/or requirements.

NOTES:

11 Design validation follows successful design verification (see 4.4.7).

12 Validation is normally performed under defined operating conditions.

13 Validation is normally performed on the final product, but may be necessary in earlier stages prior to product completion.

14 Multiple validations may be performed if there are different intended uses.

4.4.8.1 Documentation of Design Verification and Validation: ***At the completion of development, the supplier shall ensure that reports, calculations, test results, etc. demonstrate that the product definition meets the specification requirements for all identified operational conditions and the product will function correctly.***

4.4.8.2 Design Verification and Validation Testing**: **Where tests are necessary for verification and validation, these tests shall be planned, controlled, reviewed, and documented to ensure and prove the following:

- ***test plans or specifications identify the product being tested and the resources being used, define test objectives and conditions, parameters to be recorded, and relevant acceptance criteria,***
- ***test procedures describe the method of operation, the performance of the test, and the recording of the results***
- ***the correct configuration standard of the product is submitted for the test,***
- ***the requirements of the test plan and the test procedures are observed,***
- ***the acceptance criteria are met.***

4.4.9 Design Changes: All design changes and modifications shall be identified, documented, reviewed and approved by authorized personnel before their implementation.

Design change approval

The supplier's design control shall provide for customer and/or regulatory authority approval of changes, when required by contract or regulatory requirement.

4.5 Document and Data Control:

4.5.1 General: The supplier shall establish and maintain documented procedures to control all documents and data that relate to the requirements of this document including, to the extent applicable, documents of external origin such as standards and customer drawings.

NOTE 15: Documents and data can be in the form of any type of media, such as hard copy or electronic media.

4.5.2 Document and Data Approval and Issue: The documents and data shall be reviewed and approved for adequacy by authorized personnel prior to issue. A master list or equivalent document control procedure identifying the current revision status of documents shall be established and be readily available to preclude the use of invalid and/or obsolete documents.

This control shall ensure that:

a. the pertinent issues of appropriate documents are available at all locations where operations essential to the effective functioning of the quality system are performed;

b. invalid and/or obsolete documents are promptly removed from all points of issue or use, or otherwise assured against unintended use;

c. any obsolete documents retained for legal and/or knowledge-preservation purposes are suitably identified.

When customer furnished digital data is used for design, production and/or inspection, the supplier shall establish system controls in accordance with customer requirements.

4.5.3 Document and Data Changes: Changes to documents and data shall be reviewed and approved by the same functions/organizations that performed the original review and approval, unless specifically designated otherwise. The designated functions/organizations shall have access to pertinent background information upon which to base their review and approval.

Where practicable, the nature of the change shall be identified in the document or the appropriate attachments.

Document change incorporation: the supplier shall establish a process to ensure the timely review, distribution, implementation and maintenance of all authorized and released drawings, standards, specifications, planning, and changes. The supplier shall maintain a record of change incorporation and, when required, shall coordinate these incorporations with the customer and/or regulatory authority.

4.6 Purchasing:

4.6.1 General: The supplier shall establish and maintain documented procedures to ensure that purchased product (see 3.1) conforms to specified requirements.

The supplier shall be responsible for the quality of all products purchased from subcontractors, including customer-designated sources.

4.6.2 Evaluation of Subcontractors: The supplier shall:

a. evaluate and select subcontractors on the basis of their ability to meet subcontract requirements including the quality system and any specific quality assurance requirements;

b. define the type and extent of control exercised by the supplier over subcontractors. This shall be dependent upon the type of product, the impact of subcontracted product on the quality of final product and, where applicable, on the quality audit reports and/or quality records of the previously demonstrated capability and performance of subcontractors;

c. establish and maintain quality records of acceptable subcontractors (see 4.16);

d. ***ensure where required that both the supplier and all subcontractors use customer-approved special process sources;***

e. ***ensure that the organization having responsibility for approving subcontractor quality systems has the authority to disapprove the use of sources;***

f. ***periodically review subcontractor performance. Records of these reviews shall be maintained and used as a basis for establishing the level of supplier controls to be implemented;***

g. ***maintain procedures that define the necessary actions to take when dealing with subcontractors which do not meet requirements.***

A list of approved subcontractors shall be maintained and shall specify the scope of approval.

4.6.3 Purchasing Data: Purchasing documents shall contain data clearly describing the product ordered, including where applicable:

a. the type, class, grade or other precise identification;

b. the title or other positive identification, and applicable issues of specifications, drawings, process requirements, inspection instructions and other relevant technical data, including requirements for approval or qualification of product, procedures, process equipment and personnel;

c. the title, number and issue of the quality system standard to be applied;

d. ***design, test, examination, inspection and customer acceptance requirements and any related instructions and requirements;***

e. ***right of access by the purchaser, their customer and regulatory authorities to all facilities involved in the order and all applicable quality records;***

4.6.3 (Continued):

f. ***requirements for test specimens (production method, number, storage conditions etc.) for design approval, inspection, investigation or auditing;***

g. ***requirements relative to the notification of anomalies, changes in definition and the approval of their processing;***

h. ***requirements to flow down to subtier suppliers the applicable requirements in the purchasing documents, including key characteristics where required.***

The supplier shall review and approve purchasing documents for adequacy of the specified requirements prior to release.

4.6.4 Verification of Purchased Product: ***The supplier shall implement procedures to verify purchased products. These may include:***

- ***obtaining objective evidence of the quality of the product from subcontractors (e.g., accompanying documentation, certificate of conformity, test reports, statistical records, process control);***

- ***inspection and audit at source;***

- ***review of the required documentation;***

- ***inspection of products at delivery;***

- ***delegation of verification to the subcontractor, or subcontractor certification.***

When delegation is used the supplier shall define the requirements for delegation and maintain a list of delegations.

4.6.4.1 Supplier Verification at Subcontractor's Premises: Where the supplier proposes to verify purchased product at the subcontractor's premises, the supplier shall specify verification arrangements and the method of product release in the purchasing documents.

4.6.4.2 Customer Verification of Subcontracted Product: Where specified in the contract, the supplier's customer or the customer's representative shall be afforded the right to verify at the subcontractor's premises and the supplier's premises that subcontracted product conforms to specified requirements. Such verification shall not be used by the supplier as evidence of effective control of quality by the subcontractor.

Verification by the customer shall not absolve the supplier of the responsibility to provide acceptable product, nor shall it preclude subsequent rejection by the customer.

4.7 Control of Customer-Supplied Product:

The supplier shall establish and maintain documented procedures for the control of verification, storage and maintenance of customer-supplied product provided for incorporation into the supplies or for related activities. Any such product that is lost, damaged or is otherwise unsuitable for use shall be recorded and reported to the customer (see 4.16).

Verification by the supplier does not absolve the customer of the responsibility to provide acceptable product.

4.8 Product Identification and Traceability:

Where appropriate, the supplier shall establish and maintain documented procedures for identifying the product by suitable means from receipt and during all stages of production, delivery and installation.

Where and to the extent that traceability is a specified requirement, the supplier shall establish and maintain documented procedures for unique identification of individual product or batches. This identification shall be recorded (see 4.16).

According to the level of traceability required by contract, regulatory, or other established requirement, the supplier's system shall provide for:

- ***identification to be maintained throughout the product life;***
- ***all the products manufactured from the same batch of raw material or from the same manufacturing batch to be traced, as well as the destination (delivery, scrap) of all products of the same batch;***
- ***for an assembly, the identity of its components and those of the next higher assembly to be traced;***
- ***for a given product, a sequential record of its production (manufacture, assembly, inspection) to be retrieved.***

The supplier shall maintain the identification of the configuration of the product in order to identify any differences between the actual configuration and the agreed configuration.

4.9 Process Control:

4.9.1 General: The supplier shall identify and plan the production, installation and servicing processes which directly affect quality and shall ensure that these processes are carried out under controlled conditions. Controlled conditions shall include the following:

a. documented procedures defining the manner of production, installation and servicing, where the absence of such procedures could adversely affect quality;

b. use of suitable production, installation and servicing equipment, and a suitable working environment ***(e.g., temperature, humidity, lighting and cleanness, etc.)***

c. compliance with reference standards/codes, quality plans and/or documented procedures;

d. monitoring and control of suitable process parameters and product characteristics; ***monitoring and control of key characteristics where required by purchase order/contract;***

e. the approval of processes and equipment, as appropriate;

f. criteria for workmanship, which shall be stipulated in the clearest practical manner (e.g., written standards, representative samples or illustrations);

g. suitable maintenance of equipment to ensure continuing process capability;

h. ***accountability for all product during manufacture (e.g., parts quantities, split orders, nonconformities);***

i. ***evidence that all manufacturing and inspection operations have been completed as planned, or as otherwise documented and authorized;***

j. ***provision for the prevention, detection, and removal of foreign objects;***

k. ***utilities and supplies such as water, compressed air, electricity and chemical products to the extent they affect product quality.***

4.9.1.1 Production Documentation**: **Production operations shall be carried out in accordance with approved data.

This data shall contain as necessary:

- ***drawings, parts lists, process flow charts including inspection operations, production documents (e.g., manufacturing plans, traveler, router, work order, process cards); and inspection documents;***
- ***a list of specific or non specific tools and numerical control (NC) machine programs;***
- ***documents associated with specific tools enabling the tools to be designed, produced, validated, controlled, used and maintained.***

4.9.1.2 Control of Production Process Changes**: **Persons required to approve changes to production processes shall be identified and authorized.

The supplier shall identify those changes which require customer acceptance in accordance with contractual requirements prior to making any change.

Changes affecting processes, production equipment, tools and programs shall be documented. Procedures shall be available to control their implementation.

The results of changes to production processes shall be assessed to confirm that the desired effect has been achieved without adverse effects to product quality.

4.9.1.3 Control of Production Equipment, Tools and Numerical Control (N.C.) Machine Programs**: **Production equipment, tools and programs shall be validated prior to use, maintained and inspected periodically according to documented procedures. Validation prior to production use shall include verification of the first article produced to the design data/specification.

Storage requirements, including periodic preservation/condition checks, shall be established for production equipment or tooling in storage.

4.9.1.4 Control of Work Occasionally Performed Outside the Supplier's Facilities**: **When planning to carry-out work at a location other than its normal facilities, the supplier shall define the procedure to validate the location and to control the work.

4.9.2 ***Special Processes***: Where the results of processes cannot be fully verified by subsequent inspection and testing of the product and where, for example, processing deficiencies may become apparent only after the product is in use, the processes shall be carried out by qualified operators and/or shall require continuous monitoring and control of process parameters to ensure that the specified requirements are met.

The requirements for any qualification of process operations, including associated equipment and personnel (see 4.18), shall be specified.

NOTE 16: Such processes requiring pre-qualification of their process capability are frequently referred to as special processes.

Records shall be maintained for qualified processes, equipment and personnel, as appropriate (see 4.16).

When production operations call for special processes, the following requirements shall apply:

- ***the special processes to be implemented shall be identified and qualified prior to use;***

- ***the supplier shall control applicable aspects of special processes, as defined by the process specifications, this includes special process changes;***

- ***the supplier shall define the significant operations and parameters in the process to be controlled during production.***

4.10 Inspection and Testing:

4.10.1 General: The supplier shall establish and maintain documented procedures for inspection and testing activities in order to verify that the specified requirements for the product are met. The required inspection and testing, and the records to be established, shall be detailed in the quality plan or documented procedures.

These procedures shall specify the resources and methods to be implemented, and methods of recording the results.

These procedures shall include:

- ***identification of authorized personnel;***
- ***limits of authorization;***
- ***training and qualification requirements.***

4.10.1 (Continued):

Inspection documentation shall be maintained and controlled by the supplier. This may be part of the manufacturing documentation, but shall include:

- ***criteria for acceptance and rejection;***
- ***where in the sequence inspection and testing operations are performed;***
- ***documents recording inspection results;***
- ***identification of production inspection instruments;***
- ***documents associated with specific inspection instruments enabling them to be designed, produced, validated, controlled, used and maintained.***

When the supplier subcontracts inspection or test activities, the supplier shall control the subcontracted activity consistent with the requirements of section 4.6.

4.10.2 Receiving Inspection and Testing:

4.10.2.1 The supplier shall ensure that incoming product is not used or processed (except in the circumstances described in 4.10.2.3) until it has been inspected or otherwise verified as conforming to specified requirements. Verification of conformance to the specified requirements shall be in accordance with the quality plan and/or documented procedures.

4.10.2.2 In determining the amount and nature of receiving inspection, consideration shall be given to the amount of control exercised at the subcontractor's premises and the recorded evidence of conformance provided.

4.10.2.3 Where incoming product is released for urgent production purposes prior to verification, it shall be positively identified and recorded (see 4.16) in order to permit immediate recall and replacement in the event of nonconformity to specified requirements.

4.10.2.4 When certification test reports are utilized to accept material, the supplier shall assure that data in said reports are acceptable per applicable specifications. The supplier shall periodically validate test reports.

4.10.3 In-Process Inspection and Testing: The supplier shall:

a. inspect and test the product as required by the quality plan and/or documented procedures;

b. hold product until the required inspection and tests have been completed or necessary reports have been received and verified, except when product is released under positive-recall procedures (see 4.10.2.3). Release under positive-recall procedures shall not preclude the activities outlined in 4.10.3a).

4.10.4 Final Inspection and Testing: The supplier shall carry out all final inspection and testing in accordance with the quality plan and/or documented procedures to complete the evidence of conformance of the finished product to the specified requirements.

The quality plan and/or documented procedures for final inspection and testing shall require that all specified inspection and tests, including those specified either on receipt of product or in-process, have been carried out and that the results meet specified requirements.

No product shall be dispatched until all the activities specified in the quality plan and/or documented procedures have been satisfactorily completed and the associated data and documentation are available and authorized.

4.10.5 Inspection and Test Records: The supplier shall establish and maintain records which provide evidence that the product has been inspected and/or tested. These records shall show clearly whether the product has passed or failed the inspections and/or tests according to defined acceptance criteria. Where the product fails to pass any inspection and/or test, the procedures for control of nonconforming product shall apply (see 4.13).

Records shall identify the inspection authority responsible for the release of product (see 4.16).

Test records shall show actual test results data when required by specification or acceptance test plan.

Where required to demonstrate product qualification the supplier shall ensure that quality records provide evidence that the product meets the defined requirements.

4.10.6 First Article Inspection: ***The supplier's system shall provide a process, as appropriate, for the inspection, verification, and documentation of the first production article.***

First Article Inspection documentation shall be retained (see 4.16) and shall include a list of the characteristics required by the design data and any required tolerances, the actual results, and when testing is required, the results of the tests.

The First Article Inspection shall be updated to include production process changes or configuration changes.

4.11 Control of Inspection, Measuring and Test Equipment:

4.11.1 General: The supplier shall establish and maintain documented procedures to control, calibrate and maintain inspection, measuring and test equipment (including test software) used by the supplier to demonstrate the conformance of product to the specified requirements. Inspection, measuring and test equipment shall be used in a manner which ensures that the measurement uncertainty is known and is consistent with the required measurement capability.

Where test software or comparative references such as test hardware are used as suitable forms of inspection, they shall be checked to prove that they are capable of verifying the acceptability of product, prior to release for use during production, installation or servicing, and shall be rechecked at prescribed intervals. The supplier shall establish the extent and frequency of such checks and shall maintain records as evidence of control (see 4.16).

Where the availability of technical data pertaining to the inspection, measuring and test equipment is a specified requirement, such data shall be made available, when required by the customer or customer's representative, for verification that the inspection, measuring and test equipment is functionally adequate.

NOTE 17: For the purposes of this document the term "measuring equipment" includes measurement devices.

NOTE: ***Inspection, measuring and test equipment includes all types of devices used by any supplier or subcontractor personnel to validate materials, products, processes or other inspection, measuring and test equipment. This includes test hardware, test software, automated test equipment (ATE) and plotters used to produce inspection data. It also includes personally owned equipment used for product acceptance.***

Responsibilities shall be defined regarding the control of inspection, measuring and test equipment, including those used by operators as well as, where appropriate, test devices and tools supplied by the customer.

4.11.2 Control Procedure: The supplier shall:

a. determine the measurements to be made and the accuracy required, and select the appropriate inspection, measuring and test equipment that is capable of the necessary accuracy and precision;

b. identify all inspection, measuring and test equipment that can affect product quality, and calibrate and adjust them at prescribed intervals, or prior to use, against certified equipment having a known valid relationship to internationally or nationally recognized standards. Where no such standards exist, the basis used for calibration shall be documented.

The supplier shall maintain a list of this equipment, including where appropriate, test devices and tools supplied by the customer;

c. define the process employed for the calibration of inspection, measuring and test equipment, including details of equipment type, unique identification, location, frequency of checks, check method, acceptance criteria and the action to be taken when results are unsatisfactory;

d. identify inspection, measuring and test equipment with a suitable indicator or approved identification record to show the calibration status;

e. maintain calibration records for inspection, measuring and test equipment (see 4.16);

f. assess and document the validity of previous inspection and test results when inspection, measuring or test equipment is found to be out of calibration.

When the assessment indicates that the product may be nonconforming, disposition the nonconformance;

g. ensure that the environmental conditions are suitable for the calibrations, inspections, measurements and tests being carried out;

h. ensure that the handling, preservation and storage of inspection, measuring and test equipment is such that the accuracy and fitness for use are maintained;

i. safeguard inspection, measuring and test facilities, including both test hardware and test software, from adjustments which would invalidate the calibration setting;

j. ***define the method for recall of measuring devices that require calibration.***

NOTE 18: The metrological confirmation system for measuring equipment given in ISO 10012 may be used for guidance.

4.12 Inspection and Test Status:

The inspection and test status of product shall be identified by suitable means, which indicate the conformance or nonconformance of product with regard to inspection and tests performed.

The identification of inspection and test status shall be maintained, as defined in the quality plan and/ or documented procedures, throughout production, installation and servicing of the product to ensure that only product that has passed the required inspections and tests [or released under an authorized concession (see 4.13.2)] is dispatched, used or installed.

4.12.1 Authorized Personnel: ***Records shall identify personnel authorized to verify, certify and release products.***

4.12.2 Acceptance Authority Media: ***When acceptance authority media are used (e.g., stamps, electronic signatures or passwords), the supplier shall establish and document controls for the media.***

4.13 Control of Nonconforming Product:

4.13.1 General: The supplier shall establish and maintain documented procedures to ensure that product that does not conform to specified requirements is prevented from unintended use or installation.

This control shall provide for identification, documentation, evaluation, segregation (when practical), disposition of nonconforming product, and for notification to the functions concerned.

The procedures established by the supplier shall also take into account process nonconformity that may result in product nonconformity.

NOTE: ***Parties requiring notification of nonconforming product may include subcontractors, internal organizations, customers, distributors and regulatory authorities.***

The term " nonconforming product " includes nonconforming product returned from a customer.

4.13.2 Review and Disposition of Nonconforming Product: The responsibility for review and authority for the disposition of nonconforming product shall be defined.

Nonconforming product shall be reviewed in accordance with documented procedures. It may be:

a. reworked to meet the specified requirements;
b. accepted with or without repair by concession;
c. regraded for alternative applications, or
d. rejected or scrapped.

4.13.2 (Continued):

Where required by the contract, the proposed use or repair of product [see 4.13.2b)] which does not conform to specified requirements shall be reported for concession to the customer or customer's representative. The description of the nonconformity that has been accepted, and of repairs, shall be recorded to denote the actual condition (see 4.16).

Repaired and/or reworked product shall be re-inspected in accordance with the quality plan and/or documented procedures.

The supplier's documented procedures shall define the process for approving personnel making material review decisions.

4.13.2.1 Material Review Authority: ***Notwithstanding the requirements of 4.13.2, the supplier shall not use dispositions of use-as-is or repair, unless specifically authorized by the customer, if (1) the product is produced to customer design, or (2) the nonconformity results in a departure from the contract requirements.***

Unless otherwise restricted in the contract, supplier-designed product which is controlled via a customer specification may be dispositioned by the supplier as use-as-is or repair, provided the nonconformity does not result in a departure from customer-specified requirements.

4.13.2.2 Regrading Material: ***Product dispositioned for regrade requires a change in product identification to preclude the product's original use. Adequate test reports and certifications shall reflect the regrading.***

4.13.2.3 Scrap Material: ***Product dispositioned for scrap shall be conspicuously and permanently marked, or positively controlled, until physically rendered unusable.***

4.13.2.4 Notification: ***The supplier's system shall provide for timely reporting of nonconformities that may affect product already delivered including any continuing airworthiness actions. Notification shall include a clear description of the nonconformance, which includes as necessary parts affected, customer and/or supplier part numbers, quantity, and date(s) delivered.***

4.14 Corrective and Preventive Action:

4.14.1 General: The supplier shall establish and maintain documented procedures for implementing corrective and preventive action.

Any corrective or preventive action taken to eliminate the causes of actual or potential nonconformities shall be to a degree appropriate to the magnitude of problems and commensurate with the risks encountered.

The supplier shall implement and record any changes to the documented procedures resulting from corrective and preventive action.

4.14.2 Corrective Action: The procedures for corrective action shall include:

a. the effective handling of customer complaints and reports of product nonconformities;

b. investigation of the cause of nonconformities relating to product, process and quality system, and recording the results of the investigation (see 4.16);

c. determination of the corrective action needed to eliminate the cause of nonconformities;

d. application of controls to ensure that corrective action is taken and that it is effective;

e. ***flow down of the corrective action requirement to a subcontractor, when it is determined that the subcontractor is responsible for the root cause;***

f. ***specific actions where timely and/or effective corrective actions are not achieved.***

4.14.3 Preventive Action: The procedures for preventive action shall include:

a. the use of appropriate sources of information such as processes and work operations which affect product quality, concessions, audit results, quality records, service reports and customer complaints to detect, analyze and eliminate potential causes of nonconformities;

b. determination of the steps needed to deal with any problems requiring preventive action;

c. initiation of preventive action and application of controls to ensure that it is effective;

d. ensuring that relevant information on actions taken is submitted for management review (see 4.1.3).

4.15 Handling, Storage, Packaging, Preservation and Delivery:

4.15.1 General: The supplier shall establish and maintain documented procedures for handling, storage, packaging, preservation and delivery of product.

These procedures shall also cover the specific requirements for:

- ***cleaning,***
- ***prevention, detection and removal of foreign objects,***
- ***special handling for sensitive products,***
- ***marking and labeling including safety warnings,***
- ***shelf life control and stock rotation,***
- ***hazardous materials***

where applicable in accordance with product specifications and/or applicable regulations.

4.15.2 Handling: The supplier shall provide methods of handling product that prevent damage or deterioration.

4.15.3 Storage: The supplier shall use designated storage areas or stock rooms to prevent damage or deterioration of product, pending use or delivery. Appropriate methods for authorizing receipt to and dispatch from such areas shall be stipulated.

In order to detect deterioration, the condition of product in stock shall be assessed at appropriate intervals.

4.15.4 Packaging: The supplier shall control packing, packaging and marking processes (including materials used) to the extent necessary to ensure conformance to specified requirements.

4.15.5 Preservation: The supplier shall apply appropriate methods for preservation and segregation of product when the product is under the supplier's control.

4.15.6 Delivery: The supplier shall arrange for the protection of the quality of product after final inspection and test. Where contractually specified, this protection shall be extended to include delivery to destination.

The supplier shall ensure that the accompanying documents for the product are present at delivery as specified in the contract/order and are protected against loss and deterioration.

4.16 Control of Quality Records:

The supplier shall establish and maintain documented procedures for identification, collection, indexing, access, filing, storage, maintenance and disposition of quality records.

Quality records shall be maintained to demonstrate conformance to specified requirements and the effective operation of the quality system. Pertinent quality records from the subcontractor shall be an element of these data.

All quality records shall be legible and shall be stored and retained in such a way that they are readily retrievable in facilities that provide a suitable environment to prevent damage or deterioration and to prevent loss. Retention times of quality records shall be established and recorded. Where agreed contractually, quality records shall be made available for evaluation by the customer or the customer's representative for an agreed period.

Records shall be available for review by regulatory authorities as required.

NOTE 19: Records may be in the form of any type of media, such as hard copy or electronic media.

4.17 Internal Quality Audits:

The supplier shall establish and maintain documented procedures for planning and implementing internal quality audits to verify whether quality activities and related results comply with planned arrangements and to determine the effectiveness of the quality system.

Internal quality audits shall be scheduled on the basis of the status and importance of the activity to be audited and shall be carried out by personnel independent of those having direct responsibility for the activity being audited.

The results of the audits shall be recorded (see 4.16) and brought to the attention of the personnel having responsibility in the area audited. The management personnel responsible for the area shall take timely corrective action on deficiencies found during the audit.

Follow-up audit activities shall verify and record the implementation and effectiveness of the corrective action taken (see 4.16).

The supplier shall conduct internal quality audits that assess compliance to their quality system and the requirements of this document. A flow down of the requirements from this document through the supplier's quality manual to the working-level procedures must be shown. Detailed tools and techniques shall be developed such as checksheets, process flowcharts, or any similar method to support audit of the procedural requirements. The acceptability of the selected tools will be measured against the effectiveness of the internal audit process and overall supplier performance.

The supplier's personnel carrying out these audits shall have received appropriate training.

NOTE 20: The results of internal quality audits form an integral part of the input to management review activities (see 4.1.3).

NOTE 21: Guidance on quality system audits is given in ISO 10011.

4.18 Training:

The supplier shall establish and maintain documented procedures for identifying training needs and provide for the training of all personnel performing activities affecting quality.

Personnel performing specific assigned tasks shall be qualified on the basis of appropriate education, training and/or experience, as required. Appropriate records of training shall be maintained (see 4.16).

Training to achieve and maintain an awareness and understanding of relevant procedures and instructions, shall be provided.

4.19 Servicing:

Where servicing is a specified requirement, the supplier shall establish and maintain documented procedures for performing, verifying and reporting that the servicing meets the specified requirements.

These procedures shall contain:

- ***a method of collecting and analyzing in-service data;***
- ***the actions to be taken where problems are identified after delivery, including investigation and reporting activities including actions on service information consistent with contractual and/or regulatory requirements;***
- ***the control and updating of technical documentation;***
- ***the approval, control and use of repair schemes;***
- ***the controls required for off site work (e.g., supplier's work undertaken at the customer's facilities).***

4.20 Statistical Techniques:

4.20.1 Identification of Need: The supplier shall identify the need for statistical techniques required for establishing, controlling and verifying process capability and product characteristics.

4.20.2 Procedures: The supplier shall establish and maintain documented procedures to implement and control the application of the statistical techniques identified in 4.20.1.

According to the nature of the product and depending on the criticality and the specified requirements, these statistical techniques may be used to support:

- ***design verification (e.g., Reliability, Maintainability, Safety);***
- ***process control:***
  - ***selection and inspection of key characteristics;***
  - ***process capability measurements;***
  - ***statistical process control;***
  - ***design of experiment;***
- ***inspection: matching sampling rate to the criticality of the product and to the process capability;***
- ***quality management: use of statistical techniques to determine required improvement activities;***
- ***failure mode and effect analysis.***

4.20.2 (Continued):

When the supplier uses sampling inspection as a means of product acceptance, the plan shall be statistically valid and appropriate for use. The plan shall preclude the acceptance of known defectives in the lot. When required, the plan shall be submitted for customer approval.

ANNEX A
BIBLIOGRAPHY

ISO 10007 ***Quality Management. Guidelines for configuration management***

ISO 10011 Guidelines for auditing quality systems

ISO 10012 Quality assurance requirements for measuring equipment - Part 1: metrological confirmation system for measuring equipment

ISO 10013 Guidelines for developing quality manuals

Below is an item of proof for my submissions comments on the RAAF locking files for no apparently valid reason.

Below is a file which has been partially locked by the RAAF. It relates to an RAAF pilot killed in an aircraft crash in NSW in 1943. Thirty six pages of the file are open but an unknown number of pages are sealed. Why?

One theory from people who have visited the crash site is that the aircraft was shot down by RAAF or USAAF aircraft as there are numerous bullet holes in the wreck. These bullets may have come from hunters but the longer the RAAF keep the file locked the louder those claims of an RAAF cover-up will become.

Hopefully Mr Tune will recommend that all files must be released to the public not more than 50 years after the date that the file was first created.

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Your story, our history

NAA: A9301, 410630

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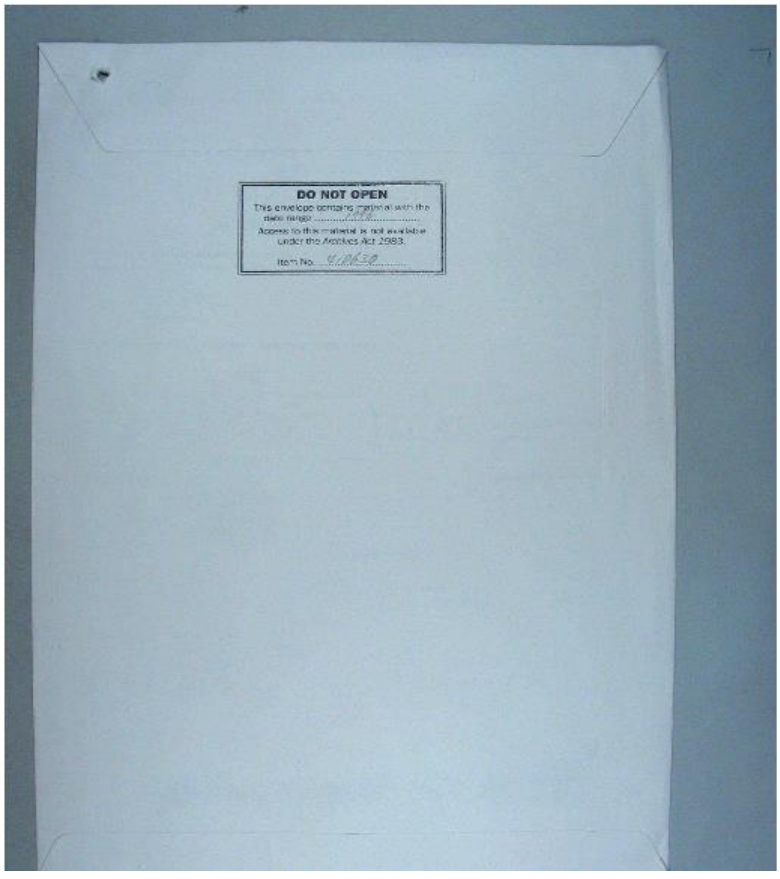

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Title	CHRISTIE RONALD CECIL : Service Number - 410630 : Date of birth - 19 Aug 1920 : Place of birth - MALVERN VIC : Place of enlistment - MELBOURNE : Next of Kin - CHRISTIE CECIL
Contents range	1939 - 1948
Series number	A9301
Control symbol	410630
Access status	Open
Barcode	5521660

Regards

Monty