Ministry of Agriculture and Lands

Integrated Land Management Bureau

Crown Registry and
Geographic Base Branch

Specifications
for
Aerial Photography
Database Files

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Owner: APLS/CRGB/MAL
Version No.: 1.4

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Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008

ARCS/ORCS: 10030-06-004

1

Record of Amendments

Revision No.	Revision made by	Page #	Revision Description	Approved by	Signature	Date
1	Alan Spring, APLS	15	Section 3.2.3 Updated to include additional film emulsion codes	Ron Johnson, Manager, APLS	PDF signed by Ron Johnson	March 10, 2005
2	Alan Spring, APLS		Ministry name change	Ron Johnson, Manager, APLS	PDF signed by Ron Johnson	July 8th, 2005
3	Jim Hogg, APLS		Document updated for Digital Camera photography			2006
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5	Alan Spring		Branch name change	Andy Calarco, Manager APDI	PDF signed by Andy Calarco	April, 2008

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Owner: APLS/CRGB/MAL
Version No.: 1.4

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008

Doc. No.:   ARCS/ORCS: 10030-06-004   2

TABLE OF CONTENTS

Owner: APLS/CRGB/MAL   Title: Specifications for Aerial Photography Database Files
Version No.: 1.4   Issue Date: April, 2008   Reviewed Date: April, 2008

Doc. No.:   ARCS/ORCS: 10030-06-004   3

Owner: APLS/CRGB/MAL   Title: Specifications for Aerial Photography Database Files
Version No.: 1.4   Issue Date: April, 2008   Reviewed Date: April, 2008

Doc. No.:   ARCS/ORCS: 10030-06-004   4

INTRODUCTION

The Airborne Remote Sensing Unit, Crown Registry and Geographic Base Branch (CRGB) manages a significant aerial photography program for the Province. The photography acquired through the provincial program is stored centrally in a controlled environment. Various products, derived from the photography, are available to all Provincial Ministries, the Private Sector, and the General Public.

These specifications are written in order to allow the information as collected or created in the field under the Provincial Aerial Photography Program to be imported to the Air Photo System database (APS). This system is an important tool for the effective organization, management, and access for aerial photography in the province.

The Aerial Photography Database Files organize the information in the following four different categories and formats; Collected Global Positioning System (GPS) files, Film Record Files, Daily Progress files and High Precision GPS files (UTM).

This publication outlines and describes in detail each type of file.

GENERAL

All contractors acquiring aerial photography for the province are required to adhere to these data file specifications.

These specifications supersede all previous specifications.

The term "Branch" when used herein shall mean Crown Registry and Geographic Base Branch of the Ministry of Agriculture and Lands in the Province of British Columbia.

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Owner: APLS/CRGB/MAL	Title: Specifications for Aerial Photography Database Files
Version No.: 1.4	Issue Date: April, 2008 Reviewed Date: April, 2008
Doc. No.:	ARCS/ORCS: 10030-06-004 6

For the purpose of these Specifications; the word "shall" indicates a mandatory requirement and "should" indicates a desirable requirement.

The Branch shall be the final authority on acceptance or rejection of submitted data files.

For the purposes of these and the associated specifications term "Roll" shall indicate a series of images either film based or digital with similar attributes. A "Roll" should be limited to a Maximum of 250 images. A "Roll" may be referred to as a "Film/Roll" in some cases. Ground Sample distance may be referred to as "GSD"

The contractor shall be required to provide remedial action in each case where the Specifications are not achieved,

All database files submitted to the Branch shall meet the following Specifications:

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Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

7

SECTION 1 - GPS Field Data Returns

1.0 SUBMISSIONS

A GPS Field Data Return file shall form part of each roll submission.

The naming convention for the files shall be the Operation number followed by the submitting agency code, as assigned by the Branch, as an extension.

The GPS Field Data Returns shall be formatted as ASCII text files.
All data fields are right justified within the correct columns unless otherwise stated.

All database files shall be submitted using a method agreed to by the Branch. The methods could include FTP, E-mail attachment, CD or floppy disks suitable for PC use.

The data fields are outlined in 2.0 – GPS Data File Returns and described in detail in 3.0 - GPS Field Definitions and Codes.

2.0 GPS DATA FILE RETURNS

2.1 Type 01 : Header File

One record per unique Operation

Data Type.................................. 2 characters; ..... columns 1-2 ("**01**")

Operation Unique ID .... 6 characters; ..... columns 4-9

Operation Name......................... 20 characters; ... columns 11-30

Photo Scale or GSD Code......... 2 characters; ..... columns 32-33

Specifications Code .... 2 characters; ..... columns 35-36

Operation Comments Code....... 3 characters; ..... columns 38-40

Horizontal Datum Code .... 1 character; .... column 42

Vertical Datum Code.................. 1 character; .... column 44

Requesting Agency Code.......... 3 characters; ..... columns 46-48

Operation Number .... 9 characters; ..... columns 50-58

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004   8

File Submission Date .... 6 characters; ..... columns 60-65 (yymmdd)

Submitting Agency .... 3 characters; ..... columns 67-69 (Contractor)

2.2   Type 02 : Roll Information File

May be several records per each Type 01

Data Type .... 2 characters; ...... columns 1-2 ("**02**")

Roll Number .... 10 characters; .... columns 4-13

Camera Focal Length Code .... 3 characters; ...... columns 15-17

Emulsion or Sensor Code .... 3 characters; ...... columns 19-21

2.3   Type 03 : Line Information File

May be several records per each Type 02

Data Type .... 2 characters; ..... columns 1-2 ("**03**")

Flight Line No. .... 3 characters; ..... columns 4-6 (**Must be right Justified**)

Flight Line Sub-identifier .... 1 character; .... column 7

Average Flying Height .... 5 characters; ..... columns 8-12 in metres

Requested Flying Height .... 5 characters; ..... columns 14-18 in metres

Flight Line Azimuth .... 7 characters; ..... columns 20-26 (dddmmss)

2.4   Type 04 : Photo Information File

May be several records per each Type 03

Data Type .... 2 characters; ..... columns 1-2 ("**04**")

Photo Frame No. .... 3 characters; ..... columns 4-6

Date of Photo .... 6 characters; ..... columns 7-12   (yymmdd)

Time of Exposure .... 6 characters; ..... columns 13-18 (hhmmss) PST

NTS Mapsheet No. .... 6 characters; ..... columns 19-24

Latitude .... 10 characters; ... columns 25-34   (ddmmss.ssss)

Latitude Accuracy Est. .... 4 characters; ..... columns 35-38 ###.# in metres

Longitude .... 11 characters; ... columns39-49 (dddmmss.ssss)

Longitude Accuracy Est. .... 4 characters; ..... columns 50-53 ###.# in metres

Height .... 5 characters; ..... columns 54-58   in metres

Printed copy of this document is uncontrolled. For latest version see Specifications for Aerial Photography Database Files posted at http://ilmbwww.gov.bc.ca/bmgs/airphoto/specs/

Owner: APLS/CRGB/MAL   Title: Specifications for Aerial Photography Database Files
Version No.: 1.4   Issue Date: April, 2008   Reviewed Date: April, 2008
Doc. No.:   ARCS/ORCS: 10030-06-004   9

Height Accuracy Est. ....3 characters; .....columns 59-61 ### <u>in metres</u>

Coordinates Refer To ....1 character; ....column 62

Horizontal Coord. Method ....1 character; ....column 63

Height Method ....1 character; ....column 64

Solar Angle ....6 characters; .....columns 65-70   (ddmmss)

Sun Azimuth ....7 characters; .....columns 71-77   (dddmmss)

Photo Substandard Code ....1 character; ....column 78   Y/N

Scale Of Photo Off...................1 character; ....column 79   Y/N

Short Forward Overlap ....1 character; ....column 80   Y/N

Course Correction ....1 character; ....column 81   Y/N

Excess Crab ....1 character; ....column 82   Y/N

Verticality Off...........................1 character; ....column 83   Y/N

Combined Crab/Vert. Off.........1 character; ....column 84   Y/N

Excess Smoke/Haze ....1 character; ....column 85   Y/N

Excess Cloud/Shadow ....1 character; ....column 86   Y/N

Excess Base Fog.....................1 character; ....column 87   Y/N

Low Sun Angle........................1 character; ....column 88   Y/N

Target Station Number ....5 characters; .....column 89 - 93

2.5   Type 05 : Lateral Gap File

May be several records per each Type 03

Data Type .... 2 characters;columns 1-2 ("**05**")

Lateral Gap with Flight Line No.... 3 characters;columns 4-6

LG Start Film/Roll Tag.................. 10 characters;   columns 8-17

Lateral Gap Start Frame............... 3 characters;columns 19-21

LG End Film/Roll Tag .... 10 characters;   columns 23-32

Lateral Gap End Frame................ 3 characters;columns 34-36

2.6   Type 06 : Substandard Lateral Overlap

May be several records per each Type 03

Data Type ....2 characters; .....columns 1-2 ("**06**")

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

10

SLO with Flight Line No...........3 characters; .....columns 4-6

SLO Start Film/Roll Tag...........10 characters; ...columns 8-17

SLO Start Frame ....3 characters; .....columns 19-21

SLO End Film/Roll Tag............10 characters; ...columns 23-32

SLO End Frame......................3 characters; .....columns 34-36

2.7   Type 99 : End Of File Indicator

3.0 FIELD DEFINITIONS AND CODES

3.1   TYPE 01- Header file definitions and codes

3.1.1   Operation Unique ID

6 characters;   columns 4-9

A short version of the Operation number consisting of the two-digit year and the three digit assigned number. – yy### e.g. 93123

3.1.2   Operation Name

20 characters; columns 11-30

The assigned name of the Operation - left justified

3.1.3   Photo Scale or Ground Sample Distance (GSD) Codes

2 characters;   columns 32-33

A 2 digit code identifying the nominal Scale of Photography

05=1:5000 scale,

10=1:10000 scale,

15=1:15,000 scale,

 (Note: For irregular scales determine the code by rounding the scale to the nearest thousand)

Ground Sample Distance will use a code based on the Ground Pixel size in centimetres with leading zeros as required. For Ground Sample distances greater

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

11

than 1 Metre, the codes will be rounded to the nearest metre a record without leading zeros.

07= 7 Centimetre GSD

 2= 2 metre GSD

3.1.4 Specification Codes

6 character; columns 35-36

A 2 character code identifying the general Specifications of the Operation.

(new codes can be added)

- DC – Dual Camera
- FF – Fire Photography
- LF - Leaf Free
- LO – Leaf Out
- MS - Main Season
- OR – Orthophoto Mapping Photography
- SP – Site Specific
- …

3.1.4.1 Operation Comment Code

3 character; columns 38-40

A 3 character code identifying comments related to the entire Operation.

(new codes can be added)

- DC – Dual Camera
- FF – Fire Photography
- LF - Leaf Free
- LO – Leaf Out
- MS - Main Season
- OR – Orthophoto Mapping Photography
- PDC – Pre-determined Photo Centres
- SP – Site Specific

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004   12

- …

3.1.5 Horizontal Datum Codes

1 character; columns 42

A 1 character code identifying the Horizontal Datum used to determine the horizontal coordinates.

(A) = NAD83

(B) = NAD27

3.1.6 Vertical Datum Codes

1 character;   column 44

A 1 character code identifying the Vertical Datum used to determine height.

- (A) - MSL (Mean Sea Level)
- (B) - ELLIP (Ellipsoid)

3.1.7 Requesting Agency Codes

3 characters; columns 46-48

A 3 character code identifying the agency requesting the photography.

- 001 - Forests
- 002 - Forests Inventory
- 003 - Forests Silviculture
- 004 - Forests Protection
- 005 - Forests Small Business
- 006 - Environment
- 007 - Lands
- 008 - Transportation and Highways
- 009 - Parks
- 010 - BC Assessment Authority
- 011 - Agriculture, Fisheries and Food
- 012 – Forest Company
- …

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Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

13

3.1.8 Operation Number

9 characters; columns 50-58

A 9 character code assigned to each Operation to uniquely identify and quickly outline an Operation by the Branch.

Format:

First one or two are characters: B = B&W, C = Colour, D= Digital, IR = Infrared (B&W or Colour)

Next three are Digits: Assigned number of the Operation.

Next one or two are characters: Requesting agency code

Last two are digits: Last two digits of the year of photography

E.g. IR017AF96, B066F96 (Right Justified)

3.1.9 File Submission Date

6 characters; columns 60-65

The date that the data file was submitted to the Branch.

Format: yymmdd

yy: last two digits of the year e.g. 93, 98, 00(2000), 01(2001)

mm: number relating to the month of year e.g. May = 05

dd: Day of the month.

3.1.10 Submitting Agency

3 characters; columns 67-69

A 3-character code assigned by the Branch identifying the contractor or other supplier of the photography.

3.2   TYPE 02- Roll Information

3.2.1 Roll Number

10 characters; columns 4-13

A series of characters assigned by the Branch that uniquely identified a roll of film.

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

14

Format: First two are digits: camera focal length code (88 = 88mm, 15 = 153,

30 = 305mm, 60 = 610mm, …)

Next two are characters: = BC

Next character: B = B&W, C = Colour, D= Digital, I = B&W Infrared,

F = False Colour Infrared.

Next two are digits: Last two digits of the year of photography e.g. 98, 00(2000),

Last three are digits: sequential roll number.

3.2.2 Camera Focal Length Code

3 characters;   columns 15-17

A three digit code identifying the nominal Camera Focal length in millimetres.

(new values can be added)

- 083,
- 088,
- 127,
- 153,
- 203,
- 305,
- 610,

3.2.3 Film Emulsion Codes

3 characters;   columns 19-21

A 3 Character code identify the type of Film Emulsion Code used for an Operation.

(new codes can be added)

001 = Kodak Black & White Infrared 2424

002 = Kodak Black & White 2405

003 = Kodak Color Negative 2445

004 = Kodak Color Infrared 2443

005 = Kodak Plus X Black & White 2402

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004   15

006 = Kodak Tri X Black & White 2403

007 = Agfa Pan 50 PE

008 = Agfa Pan 150

009 = Agfa Pan 200

010 = Agfa Color 200

011 = Kodak Aero LX Black & White 2408

012 = Kodak Color Reversal 2448

013 = Kodak Panatomic-X Aerographic II 2412

014 = Kodak Aerocolor III 2444

015 = Kodak Aerochrome III Infrared 1443

016 = Kodak Ektachrome Aero 8442

017 =

018 = Kodak Ektachrome Infrared Aero 8443

019 = Dupont Cronar 131R

020 = Agfa Pan P80

021= Agfa X100

030 = Ilford #1 Pan

031 = Eastman SS Pan Aero EA#1

050 = Digital

051 = Digital Panchromatic

052 = Digital Red Channel only

053 = Digital Green Channel only

054 = Digital Blue Channel only

055 = Digital Near Infrared (NIR) only

056 = Digital Colour (RGB)

057 = Digital All Channels (P,R,G,B,NIR)

3.3   TYPE 03- Line Information

3.3.1   Flight Line Number

3 characters;   columns 4-7,

First three digits: A number identifying the proposed fight line within the current Operation as assigned by the Branch.

Format**:** Must be no space between the Flight line number and the Flight line Sub-identifier and the Sub-identifier must follow the Flight line number. May be leading zero filled.

3.3.1.1 Flight Line Sub-identifier

1 character;   column 4-7

A single letter used to identify line segments of broken lines.

Format: (A, B, C,) Blank if not required.

3.3.2 Average Flying Height

5 characters;   columns 8-12

A calculated value averaging the collected height of each photo within this segment of film.

Format: 5 digits reported to the nearest metre.

3.3.3 Requested Flying Height

5 characters;   columns 14-18

A number confirming the flying height assigned to this flight line by the Branch.

Format: 5 digits reported to the nearest metre.

3.3.4 Flight Line Azimuth

7 characters;   columns 20-26

A compass direction reporting the heading flown for this line segment.

Format: dddmmss

d = degrees (0 – 359)

m = minutes (0 – 59)

s = seconds (0 – 59)

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

17

3.4 TYPE 04- Photo Information

3.4.1 Photo Frame Number

3 characters;   columns 4-6

The final frame number assigned to a usable exposure.

Format: 3 digits (1 – 999)

3.4.2 Date of Photo

6 characters;   columns 7-12

The date the film was exposed.

Format: yymmdd

yy: last two digits of the year e.g. 93, 98, 00(2000), 01(2001)

mm: number relating to the month of year e.g. May = 05

dd: Day of the month.

3.4.3 Time of Exposure

6 characters;   columns 13-18

The time expressed in Pacific Standard Time that the film was exposed.

Format: hhmmss

h = hours (0 – 24)

m = minutes (0 - 59

s = seconds (0-59),

3.4.4 NTS Mapsheet Number

6 characters;   columns 19-24

The National Topographic Series map, at the 1:50000 scale, that the photo falls within.

Format: 114P14 = 114P/14

3.4.5 Latitude

10 characters; columns 25-34

Format: ddmmss(.)ssss (**Decimal point is NOT included in the file**)

Owner: APLS/CRGB/MAL
Version No.: 1.4

Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008

ARCS/ORCS: 10030-06-004

18

d = degrees latitude (48-60)

m = minutes latitude (0 – 59)

s = Seconds latitude (0 – 59.9999)

3.4.6 Latitude Accuracy Estimate

4 characters;   columns 35-38

An estimate of the precision achieved in recording the actual photo centre.

Format: mmm$_{(.)}$m (**Decimal point is NOT included in the file**)

m = metres

3.4.7 Longitude

11 characters; columns 39-49

Format: dddmmss$_{(.)}$ssss (**Decimal point is NOT included in the file**)

d = degrees latitude (113-139)

m = minutes latitude (0 – 59)

s = Seconds latitude (0 – 59.9999)

3.4.8 Longitude Accuracy Estimate

4 characters;   columns 50-53

An estimate of the precision achieved in recording the actual photo centre.

Format: mmm$_{(.)}$m (**Decimal point is NOT included in the file**)

m = metres

3.4.9 Height

5 characters;   columns 54-58

The recorded flying height of the photo in metres above sea level.

Format: mmmmm

M = metres

3.4.10 Height Accuracy Estimates

3 characters;   columns 59-61

An estimate of the precision achieved in recording the actual flying height.

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

19

Format: mmm

m = metres

3.4.11 Coordinates Reference Point Codes

1 character;   column 62

The code indicating the point referred to by the Coordinates - A, B, ...

A – Perspective camera centre (exposure station)

B - Ground photo centre

-...

3.4.12 Horizontal Coordinates Method Codes

1 character;   column 63

The code describing how the Horizontal Coordinates were determined;

A - Absolute GPS

B - Differential GPS

C - Photogrammetric

D - Absolute GPS with Inertial

E - Differential GPS with Inertial

F - Visual Interpretation (Scaled Off Map) …

3.4.13 Height Method Codes

1 character;   column 64

The code describing how the Flying Height above sea level was determined.

A - Absolute GPS

B - Differential GPS

C - Altimeter

D - Photogrammetric

3.4.14 Solar Angle

6 characters;   columns 65-70

The solar angle calculated for the time and location of this photo.

Format – ddmmss

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

20

d= degrees

m= minutes

s= seconds

3.4.15 Sun Azimuth

7 characters;   columns 71-77

The sun azimuth calculated for the time and location of this photo.

Format – dddmmss

d= degrees

m= minutes

s= seconds

3.4.16 Photo Substandard Code

1 character;   column 78

A code indicating a problem with the photo - Y/N

3.4.17 Scale Of Photo Off Code

1 character;   column 79

A code indicating that the photo is not at the scale selected for the Operation - Y/N

3.4.18 Short Forward Overlap Code

1 character;   column 80A code to identify photos with short forward overlaps - Y/N

3.4.19 Course Correction Code

1 character;   column 81

A code to identify photos with excessive course corrections - Y/N

3.4.20 Excess Crab Code

1 character;   column 82

A code to identify photos with excessive crab (yaw) - Y/N

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Owner: APLS/CRGB/MAL	Title: Specifications for Aerial Photography Database Files	
Version No.: 1.4	Issue Date: April, 2008 Reviewed Date: April, 2008	
Doc. No.:	ARCS/ORCS: 10030-06-004	21

3.4.21 Verticality Off Code

1 character;   column 83

A code to identify photos where the lens axis is not vertical - Y/N

3.4.22 Combined Crab/Verticality Off Code

1 character;   column 84

A code to identify photos where the combination of crab and non-verticality exceeds the specified value - Y/N

3.4.23 Excess Smoke/Haze Code

1 character;   column 85

A code to identify photos with excessive smoke and/or haze - Y/N

3.4.24 Excess Cloud/Shadow Code

1 character;   column 86

A code to identify photos with excessive Cloud and/or shadow - Y/N

3.4.25 Excess Base Fog Code

1 character;   column 87

A code to identify photos with excessive base fog - Y/N

3.4.26 Low Sun Angle Code

1 character;   column 88

A code to identify photos with the sun angle lower than 38° - Y/N

3.4.27 Target Station Number

5 characters;   columns 89-93

The number identifying the geographic location where this exposure was predetermined. The target station number is made unique in conjunction with the line number. When using Pre-position photo centre technology each photo will correspond to a targeted location.

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004   22

3.5   TYPE 05- Lateral Gap File

- May be several records per each Type 03

3.5.1   Lateral Gap with Flight Line Number

3 characters;   columns 4-6

The number that identifies the adjacent line, which in conjunction with the present line, has a lateral coverage gap.

3.5.2   Lateral Gap Start Film/Roll Number

10 characters; columns 8-17

The Film/roll number (see 3.2.1) that corresponds to the frame where a lateral gap starts.

3.5.3   Lateral Gap Start Frame

3 characters;   columns 19-21

The first frame of a segment with a lateral gap.

3.5.4   Lateral Gap End Film/Roll number

10 characters; columns 23-32

The Film/Roll number (see 3.2.1) that corresponds to the frame where a lateral gap ends.

3.5.5   Lateral Gap End Frame

3 characters;   columns 34-36

The last frame of lateral gap segment.

3.6   TYPE 06 : Substandard Lateral Overlap

- May be several records per each Type 03

3.6.1   Substandard Lateral Overlap with Flight Line Number

3 characters;   columns 4-6

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

23

The number that identifies the adjacent line, that in conjunction with the present line, has substandard lateral coverage.

3.6.2 Substandard Lateral Overlap Start Film/Roll Number

10 characters; columns 8-17

The Film/Roll number that corresponds to the frame where a substandard lateral area starts.

3.6.3 Substandard Lateral Overlap Start Frame

3 characters;   columns 19-21

The frame number that identifies the first frame of a substandard lateral overlap area.

3.6.4 Substandard Lateral Overlap End Film/Roll Number

10 characters; columns 23-32

The Film/Roll number that corresponds to the frame where a substandard lateral area ends.

3.6.5 Substandard Lateral Overlap End Frame

3 characters;   columns 34-36

The frame number that identifies the last frame of a substandard lateral overlap area.

3.7   TYPE 99 : End Of File Indicator

Owner: APLS/CRGB/MAL

Version No.: 1.4

Doc. No.:

Title: Specifications for Aerial Photography Database Files

Issue Date: April, 2008   Reviewed Date: April, 2008

ARCS/ORCS: 10030-06-004

24

SECTION 2 – Film/Roll Record Import Data File

4.0 Overview

Film/Roll Records will be stored in the Airphoto System Database (APS). This allows for a variety of searches and queries to be performed on the Film/Roll Records. Also the printed records will have a uniform appearance. An import utility has been created to facilitate loading of the Film/Roll Record information. The format and definitions for the import files are explained in the following sections.

5.0 Submissions

A Film/Roll Record file must accompany each submission of Roll.

The naming convention for the Film/Roll Record files shall be the roll number followed with the extension REC.

The Film/Roll Record import files are comma-delimited files.

The files must adhere to these specifications.

All database files shall be submitted using a method agreed to by the Branch. The methods could include FTP, E-mail attachment, CD, or floppy disks suitable for PC use.

6.0 Film Record File Layout

The Roll number must not change in this file.

Records are lines within the file that begin with "01", "02" or "03".

Type "01" is the header / footer information describing the aircraft, camera, crew, roll and processing / Handling.

Type "02" is the map sheet data. There can be 0 or many "02" type records per type "01" in the file, each occurring on its own line

Type "03" is frame-related information. There can be 0 or many "03" type records, to a maximum of 28, per type "01", each occurring on its own line.

The file uses commas as delimiters between the values within each record. Each line must end with a comma. Because the comma is used to delimit values, data cannot contain commas.

All Fields must occur in the correct order and all fields must be represented.

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Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004   25

All field lengths in the following descriptions are maximums. Each field may contain fewer characters or even no characters providing that commas hold the place of the field.

6.1 TYPE 01

Type "01" is the header record and a new type "01" must occur for each change in the header information (i.e. new Operation, date of photography, aircraft/crew, camera/magazine, etc.) or more than 28 Type "03" records. Items marked with * are not required for Digital photography but must have place holding commas.
The Film/Roll number must not change in this file.

6.1.1 Header / Footer Information:

Data Type...2 characters; **01**,

Film / Roll Number ....12 characters; .... ,

Operation Number..12 characters; .... ,

Contractor Code...4 characters; .... ,

Aircraft ....30 characters; .... ,

Aircraft Registration No. ....20 characters; .... ,

Lens Number..15 characters; .... ,

Lens Calibrated Focal Length ....9 integers; .... ,

Emulsion Type or Sensor Bands Collected ...4 integers; .... ,

Current Sheet Number ....3 integers; .... ,

End Sheet Number...3 integers; .... ,

Photo Date ....8 integers; .... ,

Nominal Scale or Ground Sample Distance ..7 integers; .... ,

Base ....30 characters; .... ,

Port Glass...30 characters; .... ,

Control Unit...30 characters; .... ,

Magazine or Backing Plate Number ....30 characters; .... ,

Filter..30 characters; .... ,

Emulsion Number* ....50 characters; .... ,

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

26

Stock Date* ....6 integers; .... ,

Stability ....30 characters; .... ,

Weather..30 characters; .... ,

Start Time...4 integers; .... ,

End Time...4 integers; .... ,

Date Developed or Downloaded...................8 integers; .... ,

Processor or server......................................30 characters; .... ,

Developer*..30 characters; .... ,

Temperature* ....4 integers; .... ,

Celsius / Fahrenheit*....................................1 Character; .... ,

Feet / Minute* ....6 integers; .... ,

Number of Racks* ....3 integers; .... ,

Fixer* ....30 characters; .... ,

Average Gradient*..6 integers; .... ,

Annotated Date ....8 integers; .... ,

Indexed Date..8 integers; .... ,

Date received by Branch..............................8 integers; .... ,

Annotated By..30 characters; .... ,

Checked By...30 characters; .... ,

Developed By*..30 characters; .... ,

Indexed By ....30 characters; .... ,

Navigator ....30 characters; .... ,

Pilot...30 characters; .... ,

Photographer..30 characters; .... ,

Remarks ....150 characters; .... ,

6.2   TYPE 02

"02" data is a list of the index maps, at the NTS sheet, where the frames on this roll are located. There can be 0 or many "02" type records in the file, with each map occurring on its own type 02 line.

6.2.1　Index Map Information

Data Type...................................2 characters;..... **02**,

Index Map ....7 characters;.....,

6.3　TYPE 03

"03" is frame-related information. There can be 0 or many "03" type records, to a maximum of 28, per type "01", each occurring on its own line.

6.3.1　Frame information

Data Type..................................2 characters;..... **03**,

Final Frame Number..................4 integers;.........,

Field Frame Number..................4 integers;.........,

Time Stamp................................4 integers;.........,

True Height ....8 integers;.........,

Exposure Speed ....50 characters,...,

Exposure f stop ....6 integers;.........,

Drift..6 characters......,

Line number ....4 characters......,

Direction Flown ....3 integers ....,

Status ....10 characters....,

Comments.................................150 characters..,

6.4　Film Record Column Descriptions

6.4.1　Type 01 –Header / Footer Fields

(1) Data Type....................................2 characters;...... **01**,

- Must be **01**

(2) Film/Roll Number.........................10 characters..... ,

- A series of 10 characters assigned by the Branch that uniquely identifies a roll of film.

- Format:..................................##CCCYY###

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008　　Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

28

- First two are digits: camera focal length code

  (88 = 88mm, 15 = 153, 30 = 305mm, 60 = 610mm, …)
- Next two are characters: = BC
- Next character: B = B&W, C = Colour, D = Digital

  I = B&W Infrared, F = False Colour Infrared.
- Next two are digits: Last two digits of the year of photography

  E.g. 98, 00 (2000),
- Last three are digits: sequential film/roll number.

(3) Operation Number........................12 characters;....,
- An up to 12-character code assigned to each Operation to uniquely identify and quickly outline an Operation by the Branch.
- Format:....................................CC-###-CC-YY (Dashes included)
- First one or two are characters: B = B&W, C = Colour,, D = Digital, IR = Infrared (B&W or Colour)
- Next three are Digits: Assigned number of the Operation.
- Next one or two are characters: Requesting agency code
- Last two are digits: Last two digits of the year of photography

(4) Contractor Code..........................4 characters;......,
- A 3-character code assigned by the Branch identifying the contractor or other supplier of the photography.

(5) Aircraft ....30 characters;....,
- The make and model of the aircraft used to acquire this segment of film.

  E.g. Cessna 441

(6) Aircraft Registration No...............20 characters;....,
- Registration number as assigned by the registering agency.

  E.g. CF-BCD (including dashes)

(7) Lens Number...............................15 characters;....,
- The serial number of the Lens (not the camera or optical unit) used for this photography as it appears on the calibration report.

(8) Lens Calibrated Focal Length.....9 integers;..........,

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

29

- The current calibrated focal length of the lens used for this photography. Leading zeros are not required, but the decimal point must be included.
- E.g. 153.436

(9) Emulsion Type or Sensor Bands Collected............ 4 integers; ,
- The emulsion number of the film assigned by the manufacturer. E.g. 2405, 2445,…
- A code representing the image bands collected as listed below:
  - D001 = Panchromatic
  - D002 = Red
  - D003 = Green
  - D004 = Blue
  - D005 = Near Infrared (NIR)
  - D006 = Colour
  - D007 = All (P,R,G,B,NIR)

(10).Current Sheet Number .... 3 integers; .... ,
- The count of this group of type 01, 02 and 03 information within this Film Record. (I.e. relates to a page number (**1**of 3) on a hardcopy.)

(11).End Sheet Number................... 3 integers; .... ,
- The total count of the groups of type 01, 02 and 03 information within this Film Record. (I.e. relates to the total number of pages (1of **3**) on a hardcopy.)

(12).Date of photography................. 8 integers; .... ,
- Date must be formatted: 4-digit year, 2-digit month and 2-digit day. (YYYYMMDD) With no spaces or punctuation.
  E.g. February 14, 1991 = 19910214

(13).Nominal Scale or Average Ground Sample Distance   7 integers; ,
- Only the number following the colon is required for scale. E.g. 1:10000 = 10000, 1:5000 = 5000
- For Ground Sample Distance; record the ground pixel size in Millimetres

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Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

30

(14). Base.......................................30 characters;....,

- Airport from which the flight-crew operated. Enter the name, not the abbreviation. E.g. Victoria, Kamloops…

(15). Port Glass................................30 characters;....,

- Serial Number of the Camera Port Glass mounted in this aircraft. Can be formatted as needed. (excluding commas)

(16). Control Unit..............................30 characters;....,

- Serial number, code number, and/or name of the camera control device. (Intervalometer, GPS unit, etc)
- **Note:** The camera number is populated automatically from the calibration report information stored in APS.

(17). Magazine Number Or Backing Plate .... 30 characters;   ,

- Serial number of the film magazine or camera backing plate. Can be formatted as needed. (excluding commas)

(18). Filter.......................................30 characters;....,

- Enter the cut-off limit in nanometres. E.g. 420 nm…

(19). Emulsion Number (if Applicable)........................ 50 characters;   ,

- Enter the Manufacturer's Emulsion serial number.

(20). Stock Date (If Applicable).........6 integers;..........,

- Enter the Stock Date of the film used for this photography.
- Date must be formatted: 4-digit year, 2-digit month (YYYYMM) With no spaces or punctuation.
  E.g. February, 1991 = 199102

(21). Stability ....30 characters;....,

- Indicate the general stability of the ambient air conditions while exposing this photography. (I.e. stable, mild turbulence, turbulent,)

(22). Weather ....30 characters;....,

- Indicate the general weather conditions affecting the photography at the time of exposure. Must include haze or cloud type and amount.

(23). Start Time ....4 integers;..........,

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004   31

- Time the photography recorded under this type 01 entry started.

  Format: 2-digits for hour and 2-digits for minutes, (HHMM) no punctuation.

(24) . End Time .... 4 integers; .... ,

- Time the photography recorded under this type 01 entry ended.

  Format: 2-digits for hour and 2-digits for minutes, (HHMM) no punctuation.

(25) . Date Developed or Downloaded .... 8 integers; ,

- Date must be formatted: 4-digit year, 2-digit month and 2-digit day.

  (YYYYMMDD) With no spaces or punctuation.

  E.g. February 14,1991 = 19910214

(26) . Processor (if Applicable) .... 30 characters; .... ,

- Manufacturer and model of the processor used.

(27) . Developer (if Applicable) .... 30 characters; .... ,

- Manufacturer and type of chemistry used to develop the film.

(28) . Temperature (if Applicable) ...... 4 integers; .... ,

- In degrees Celsius or Fahrenheit.

(29) . Celsius / Fahrenheit (if Applicable) .... 1 Character;   ,

- C = Celsius, F = Fahrenheit.

(30) . Feet / Minute (if Applicable) ..... 4 integers; .... ,

- Speed of film through the processor in feet per minute. One decimal place,

  Include decimal Point (003.5)

(31) . Number of Racks (if Applicable) .... 3 integers; ,

- Number of developer racks.

(32) . Fixer (if Applicable) .... 30 characters; .... ,

- Manufacturer and type of chemistry used to fix the film.

(33) . Average gradient (if Applicable) .... 6 integers; ,

- Resulting average gradient.

(34) . Date Annotated .... 8 integers; .... ,

- Date must be formatted: 4-digit year, 2-digit month and 2-digit day.

  (YYYYMMDD) With no spaces or punctuation.

  E.g. February 14, 1991 = 19910214

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004   32

(35) . Date Indexed .... 8 integers; .... ,

- Date must be formatted: 4-digit year, 2-digit month and 2-digit day. (YYYYMMDD) With no spaces or punctuation.

  E.g. February 14, 1991 = 19910214

(36) . Date received by Branch .... 8 integers; .... ,

- Leave this date blank – will be added by the Branch.

(37) . Annotated By .... 30 characters; .... ,

- Name of the Person who annotated the film.
- Names must be standardized. First initial, Period, space, Last name.

(38) . Checked By .... 30 characters; .... ,

- The Mission Manager who checked the final film report.
- Names must be standardized. First initial, Period, space, Last name.

(39) . Developed By (if Applicable) .... 30 characters; .... ,

- Name of the Person who developed the film.
- Names must be standardized. First initial, Period, space, Last name.

(40) . Indexed By .... 30 characters; .... ,

- Name of the person who indexed the film.
- Names must be standardized. First initial, Period, space, Last name.

(41) . Navigator .... 30 characters; .... ,

- Name of the person who navigated the aircraft.
- Names must be standardized. First initial, Period, space, Last name.

(42) . Pilot .... 30 characters; .... ,

- Pilot of the aircraft.
- Names must be standardized. First initial, Period, space, Last name.

(43) . Photographer .... 30 characters; .... ,

- Photographer who exposed the film.
- Names must be standardized. First initial, Period, space, Last name.

(44) . Remarks .... 150 characters; .. ,

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

33

- Enter the conditions or problems that caused a departure from the Operation specifications or have affected the Image quality. The remarks may be directed at this Particular section of the roll or at individual exposures.

6.4.2 Type 02 – Index map Fields

    (1) Data Type..........................2 characters;..... **02**,

- Must be **02** - one line for each map.

    (2) Index Map ....7 characters;.....,

The NTS maps, where the frames on this section of film are located. Format: Must be a recognized NTS map series format e.g 1:250,000 – 94A; 1:50,000 - 103P/16 ; 1:20,000 83j023

6.4.3 TYPE 03 – Frame information

The entries must account for every frame on the roll including removed film. The duplicate information on pairs of type 03 lines may be left blank on the second line.

    (1) Data Type.............................2 characters;..... **03**,

- Must be **03** – One line for each 'start', 'on', 'end', 'off' or first frame, last frame of a group of scrubbed photos.

    (2) Final Frame Number ....4 integers;.........,

- Up to 4 digits, leading zeros not required. Can be left blank if the frames are not used.

    (3) Field Frame Number ....4 integers;.........,

- Up to 4 digits, leading zeros not required. Use the last 4 counter digits, if more are shown.

    (4) Time......................................4 integers;.........,

- Start time if this line of data is a "start "or an "on".

- End time if this line of data is an "end" or an "off".

    (5) True Height...........................8 integers;.........,

- True Height recorded in feet, above mean sea level.

    (6) Exposure Speed 50 characters,   ,

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004   34

- Record the exposure speed setting for this line of photography. Only the denominator is required E.g. 1/250 = 250.

(7) Exposure f stop   6 integers; ,

- Record the f stop setting for this line of photography. Leading zeros not required. Decimal point included if applicable.

(8) Drift ....6 characters......,

- Drift correction in degrees, port or starboard. Port = P, Starboard = S. E.g. 4P or 3S

(9) Line number ....4 characters......,

- Proposed fight line number as assigned by the Branch.

(10) Direction Flown..................3 integers ....,

- True heading in degrees. E.g. west = 270, east = 090

(11) Status................................10 characters....,

- Accepted entries are blank, 'Start', 'On', 'Off', 'End' or Single.

- If the Final frame number is blank (i.e. an un-annotated part of roll) then the Status is blank with comments describing the situation.

- Enter '**start**' when the first effective exposure is at beginning of the flight line; enter '**on**' if the first effective exposure is elsewhere along the line; enter the 'on' position using geographic coordinates in the comments field.

- Enter '**end**' when the last effective exposure is at end of the flight line; enter '**off**' if the last effective exposure is elsewhere along the line; enter the 'off' position using geographic coordinates in the Comments field.

- A 'start' or an 'on' entry on a type 03 line must be followed by an 'off' or an 'end' the next type 03 line.

- Enter 'single' when one image is exposed without adjacent frames.

(12) Comments ....150 characters..,

- Brief comment regarding the status of the exposures.

- E.g. geographic coordinates of an 'on' or an 'off', leader, trailer, clearing frames, scrubbed, removed …

Owner: APLS/CRGB/MAL
Version No.: 1.4

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008

Doc. No.:

ARCS/ORCS: 10030-06-004

35

SECTION 3 – Daily Progress Import File

7.0 OVERVIEW

Daily progress by the aircrews in the field can now be recorded using GPS coordinates. This file allows for the smooth storage and retrieval of this information. The aircrews are able to submit their daily progress via electronic transfer directly to the Branch for compilation and display.

8.0 SUBMISSIONS

These files shall be submitted upon the completion of a day's photography.

The naming convention for the daily progress reports shall be the submitting agency code followed by the date (YYMMDD) with the extension DPG. In cases where multiple crews from one agency will be reporting, the last three characters of the aircraft registration can be substituted for the submitting agency code.

Following is a comma-delimited format for exporting daily progress information.

The data exported will be imported into the APS table "DAILY_PROGRESS".

The following concatenated key defines a unique record:

> Operation id
>
> Flight number
>
> Start latitude
>
> Start longitude
>
> End latitude
>
> End longitude

A file should not contain duplicate records (as defined by the above key). If a file does contain duplicate records, the file will be rejected.

8.1   Daily Progress Report File Layout

The following records can be repeated many times in a single file.

Place each record (set of columns) on a separate line.

Operation ID Number.................6 integers; ....,

Photo Date ....8 integers; ....,

Line Complete Indicator.............1 character;........ ,

Flight Line Number.....................4 characters; .....,

Start Target Station Number .....5 characters; .....,

Start Latitude.............................11 characters;...,

Start Longitude...........................12 characters;...,

End Target Station Number ......5 characters; ....,

End Latitude..............................11 characters;...,

End Longitude...........................12 characters;...,

Line Kilometres. ....9 characters; .....,

Exposures ....5 integers; ....,

(new line)

8.2   Daily Progress Column descriptions

(1) Operation ID Number ....6 integers; ....,

- The short version of the Operation number.
- Format: YY###

(2) Photo Date ....8 integers ....,

- Date of Photography
- Format: YYYYMMDD

(3) Line Complete Indicator. ......1 characters; .....,

- Line is now complete; Y = yes or N = no

(4) Flight Line Number..............4 characters; .....,

- Assigned Line number
- a three digit number followed by a letter when required

(5)   Start Target Station Number ....5 characters; ,

- Target Station number as assigned in the Operation PPC file.

(6) Start Latitude ....11 characters;...,

- Latitude recorded at the start of this line segment.
- Format: ddmmss.ssss   (Decimal point is included in the file)

Owner: APLS/CRGB/MAL
Version No.: 1.4

Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008

ARCS/ORCS: 10030-06-004   37

- d = degrees latitude   (48-60)
- m = minutes latitude   (0 – 59)
- s = Seconds latitude   (0 – 59.9999)

(7) Start Longitude .... 12 characters; ...,

- Longitude recorded at the start of this line segment.
- Format: dddmmss.ssss (Decimal point is included in the file)
- d = degrees latitude   (113-139)
- m = minutes latitude   (0 – 59)
- s = Seconds latitude   (0 – 59.9999)

(8) End Target Station Number . ... 5 characters; ,

- Target Station number as assigned in the Operation PPC file

(9) End Latitude .... 11 characters; ...,

- Latitude recorded at the end of this line segment.
- Format: ddmmss.ssss (Decimal point is included in the file)
- d = degrees latitude   (48-60)
- m = minutes latitude   (0 – 59)
- s = Seconds latitude   (0 – 59.9999)

(10) .... End Longitude... 12 characters; ,

- Longitude recorded at the end of this line segment.
- Format: dddmmss.ssss (Decimal point is included in the file)
- d = degrees latitude   (113-139)
- m = minutes latitude   (0 – 59)
- s = Seconds latitude   (0 – 59.9999)

(11) .... Line Kilometres. 9 characters; ,

- Number of line kilometres covered by this segment of film
- Format: 999999.99 (include decimal point)

(12) Exposures .... 5 integers; ....,

- Number of frames exposed for this line segment

Owner: APLS/CRGB/MAL   Title: Specifications for Aerial Photography Database Files
Version No.: 1.4   Issue Date: April, 2008   Reviewed Date: April, 2008
Doc. No.:   ARCS/ORCS: 10030-06-004   38

SECTION 4 – High Precision GPS Data File (UTM)

9.0 OVERVIEW

To enable aerial photography to be used for aero triangulation, high precision GPS coordinates must be collected at the time of photography and, presently, post-mission processed to increase the accuracy. The following section describes the files and format used to submit these coordinates.

9.1 SUBMISSIONS

When specified as a contract deliverable, the following format must be used to provide high precision coordinates for aero triangulation.

A separate file will be produced for each film/roll involved.

The naming convention for the files shall be the film/roll number shortened to the last 6 (six) characters followed by the extension UTM.

The High Precision GPS Data File (UTM) Data Returns shall be formatted as ASCII text files.

All data fields must be in the correct columns and leading / trailing zero filled where required.

All database files shall be submitted using a method agreed to by the Branch. The methods could include FTP, E-mail attachment, CD or floppy disks suitable for PC use.

9.2 UTM Data file layout

Film/Roll ....10 characters;...columns 1-10

Frame Number...........................3 integers; ....columns 12-14

Event Number ....3 integers; ....columns 16-18

Date of photography ....6 integers; ....columns 20-25   (yymmdd)

GPS Time..................................13 characters;...columns 27-39 (decimal pt. included)

Latitude ....11 characters;...columns 41-51   (decimal pt. Included)

Latitude Hemisphere..................1 character;.......column 52   (N or S)

Lat. Standard Deviation ....5 characters; .....column 54-58   (decimal pt. Included)

Longitude ....12 characters;...columns 60-71 (decimal pt. Included)

Owner: APLS/CRGB/MAL
Version No.: 1.4

Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008

ARCS/ORCS: 10030-06-004

39

Longitude Hemisphere...............1 character;.......columns 72   (E or W)

Long. Standard Deviation ....5 characters;.....column 74-78   (decimal pt. Included)

Ellipsoidal Height........................8 characters;.....columns 80-87 (decimal pt. Included)

Ellip. Ht. Standard Deviation ....5 characters;.....columns 89-93 (decimal pt. Included)

Geoidal Separation ....6 character;.......column 95-100 (sign & dec. pt. Incl.)

Orthometric Height ....8 character;.......column 102-109 (decimal pt. Included)

UTM Zone East of Photo Northing .....11 characters; columns 111-121 (decimal pt. Included)

UTM Zone East of Photo Easting ....10 characters; columns 123-132 (decimal pt. Included)

UTM Zone of Photo Northing.......11 characters;...columns 134-144 (decimal pt. Included)

UTM Zone of Photo Easting ....10 characters;...columns 146-155 (decimal pt. Included)

UTM Zone West of Photo Northing   11 characters; columns 157-167 (decimal pt. Included)

UTM Zone West of Photo Easting ......10 characters; columns 169-178 (decimal pt. Included)

Number of Satellites...........................3 characters; Columns 180-182

IMU Omega value (blank if N/A) ....8 characters; columns 184-191 (sign and decimal pt.included

IMU Phi value (blank if N/A)...............8 characters; columns 193-200 (sign and decimal pt.included

IMU Kappa value (blank if N/A) ....9 characters; columns 202-210 (sign and decimal pt.included

9.3   UTM Data File Descriptions

(1) Film/Roll................................... 10 characters; .. columns 1-10

- The first two characters are the focal length code; E.g. 15 = 153, 30 = 305, …

- Characters three and four are the province code = BC

- The fifth character is the Emulsion code; E.g. B = B&W, C = Colour

- The last five are the year code followed by the unique number; Format: YY###

- The Roll number is assigned by the Branch

(2) Frame Number .... 3 Integers; .... columns 12-14

- Final annotated frame number

(3) Event Number .... 3 characters; .... columns 16-18

- Sequential number of this data capture for this mission

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004   40

(4) Date of photography.................. 6 characters; .... columns 20-25

- Two digit year, Month number, Day (YYMMDD)

(5) GPS Time................................. 14 characters; .. columns 27-39

- GPS Time in Week Seconds

- Six integers, decimal point, six integers (999999.999999)

(6) Latitude................................... 11 characters; .. columns 41-51

- Format (DDMMSS.ssss) D= degrees, M= minutes, S=seconds

(7) Latitude Hemisphere .... 1 character .... columns 52

- North or South (N or S)

(8) Latitude Standard deviation ...... 5 characters ..... columns 54-58

- In metres

- 1digit, decimal point, three digits

(9) Longitude.................................. 12 characters ... columns 60-71

- Format (DDDMMSS.ssss) D= degrees, M= minutes, S=seconds

(10) . Longitude Hemisphere .... 1 characters ..... column 72

- East or West (E or W)

(11) . Longitude Standard deviation 5 characters ..... columns 74-78

- In metres

- 1digit, decimal point, three digit

(12) . Ellipsoidal Height .... 8 characters ..... columns 80-87

- In metres

- 4 digits, decimal point, 3 digits

(13) . Ellipsoidal Ht. Standard deviation ... 5 characters .... columns 74-78

- In metres

- 1digit, decimal point, 3 digit

(14) . Geoidal Separation................. 6 characters ..... columns 95-100

- As modelled by Geodetic Survey Division, Natural Resources Canada

- Format; sign, 1 or 2 digits, decimal point, 2 or 3 digits (E.g. –7.440 or –07.44)

(15) . Orthometric Height .... 8 characters ..... columns 102-109

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

41

- Mean Sea Level (MSL)
- In metres
- 4 digit, decimal point, 3 digit

(16) . UTM Zone East of Photo Northing............ 11 characters; columns 111-121
- UTM northing coordinate of the photo centre in the UTM zone east of the photo location
- Format; 7 digits, decimal point, 3 digits

(17) . UTM Zone East of Photo Easting .... 10 characters; columns 123-132
- UTM easting coordinate of the photo centre in the UTM zone east of the photo location
- Format; 6 digits, decimal point, 3 digits

(18) . UTM Zone of Photo Northing . 11 characters; .. columns 134-144
- UTM northing coordinate of the photo centre location
- Format, 7 digits, decimal point, 3 digits

(19) . UTM Zone of Photo Easting... 10 characters; .. columns 146-155
- UTM easting coordinate of the photo centre location
- Format, 6 digits, decimal point, 3 digits

(20) . UTM Zone West of Photo Northing........... 11 characters; columns 157-167
- UTM northing coordinate of the photo centre in the UTM zone west of the photo location
- Format; 7 digits, decimal point, 3 digits

(21) . UTM Zone West of Photo Easting .... 10 characters; columns 169-178
- UTM easting coordinate of the photo centre in the UTM zone west of the photo location
- Format; 6 digits, decimal point, 3 digits

(22)   Number of Satellites .... 3 Characters; Columns 180-182
- Record the number satellite channels collected at time of exposure

(23)   IMU Omega value (blank if N/A)…8 characters; columns 184-191
- Record the value of the IMU Omega, sign and decimal pt. included

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

42

- Eg. -0.29078

(24) ... IMU Phi value (blank if N/A).........................8 characters; columns 193-200

- Record the value of the IMU Phi, sign and decimal pt. included

- Eg. -0.73614

(25) IMU Kappa value (blank if N/A).......................9 characters; columns 202-210

- Record the value of the IMU Kappa, sign and decimal pt. included

- Eg. -92.90014

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

43

Appendix A - Sample GPS File

File: C052FB98.HMP

```
01 98052  Loop Creek        15 LO  LO A A 005 C052FB98  990217 HMP
02 30BCC98010 305 3
03 001 05182 05182 0900000
04 13298072510243209%C1048404620001000124331760001000051821 00AAC5211471293956NNNNNNNNNNNN00000
04 13398072510244509%C1048404440001000124320500001000051821 00AAC5213551294519NNNNNNNNNNNN00000
04 13498072510245709%C1048404380001000124310020001000051821 00AAC5216091295059NNNNNNNNNNNN00000
04 13598072510251009%C0948404380001000124295060001000051821 00AAC5218141295621NNNNYNNNNNNN00000
04 13698072510252209%C0948404380001000124284400001000051821 00AAC5220181300139NNNNNNNNNNNN00000
04 13798072510253609%C0948404380001000124272780001000051821 00AAC5222461300801NNNNNNNNNNNN00000
04 13898072510254909%C0948404260001000124261400001000051821 00AAC5225041301355NNNNNNNNNNNN00000
04 13998072510260209%C0948404200001000124250380001000051821 00AAC5227191301944NNNNNNNNNNNN00000
04 14098072510261509%C0948404080001000124234880001000051821 00AAC5229371302540NNNNNNNNNNNN00000
04 14198072510262709%C0948404080001000124223920001000051821 00AAC5231411303104NNNNNNNNNNNN00000
03 002 05182 05182 2700000
04 14298072510313709%C0948420180001000124140940001000051821 00AAC5313241322703NNNNNNNNNNNN00000
04 14398072510314909%C0948420120001000124152380001000051821 00AAC5314151322922NNNNNNNNNNNN00000
04 14498072510320009%C0948420060001000124162320001000051821 00AAC5315031323135NNNNNNNNNNNN00000
04 14598072510321009%C0948415940001000124172260001000051821 00AAC5315521323347NNNNNNNNNNNN00000
04 14698072510322109%C0948415820001000124182980001000051821 00AAC5316371323549NNNNNNNNNNNN00000
04 14798072510323109%C0948415760001000124192740001000051821 00AAC5317261323804NNNNNNNNNNNN00000
04 14898072510324109%C0948415760001000124202140001000051821 00AAC5318071323958NNNNNNNNNNNN00000
04 14998072510325509%C0948415820001000124214120001000051821 00AAC5319131324305NNNNNNNNNNNN00000
04 15098072510330609%C0948420000001000124224540001000051821 00AAC5319581324514NNNNNNNNNNNN00000
04 15198072510331709%C0948420060001000124235140001000051821 00AAC5320511324746NNNNNNNNNNNN00000
04 15298072510332909%C0948420180001000124245440001000051821 00AAC5321461325023NNNNNNNNNNNN00000
04 15398072510334109%C0948420180001000124260880001000051821 00AAC5322361325244NNNNNNNNNNNN00000
04 15498072510335309%C0948420180001000124271960001000051821 00AAC5323281325509NNNNNNNNNNNN00000
04 15598072510340509%C0948420120001000124282620001000051821 00AAC5324221325740NNNNNNNNNNNN00000
04 15698072510341609%C0948420060001000124293580001000051821 00AAC5325151330006NNNNNNNNNNNN00000
04 15798072510342809%C1048420060001000124304480001000051821 00AAC5326071330235NNNNNNNNNNNN00000
04 15898072510343909%C1048420060001000124314420001000051821 00AAC5326551330449NNNNNNNNNNNN00000
04 15998072510345109%C1048420120001000124325440001000051821 00AAC5327461330716NNNNNNNNNNNN00000
03 003 05182 05182 0900000
04 16098072510384609%C1048431140001000124320800001000051821 00AAC5355061342939NNNNNNNNNNNN00000
04 16198072510385809%C1048431200001000124310200001000051821 00AAC5357001343519NNNNNNNNNNNN00000
04 16298072510391109%C1048431320001000124295180001000051821 00AAC5359051344132NNNNNNNNNNNN00000
04 16398072510392209%C0948431500001000124284880001000051821 00AAC5400561344709NNNNNNNNNNNN00000
04 16498072510393409%C0948431560001000124274160001000051821 00AAC5402511345251NNNNNNNNNNNN00000
04 16598072510394509%C0948431620001000124263980001000051821 00AAC5404331345758NNNNNNNNNNNN00000
04 16698072510395709%C0948431620001000124252960001000051821 00AAC5406281350345NNNNNNNNNNNN00000
04 16798072510401009%C0948431620001000124241820001000051821 00AAC5408341351001NNNNNNNNNNNN00000
04 16898072510402209%C0948431680001000124230800001000051821 00AAC5410281351549NNNNNNNNNNNN00000
04 16998072510403309%C0948431800001000124220500001000051821 00AAC5412101352101NNNNNNNNNNNN00000
04 17098072510404409%C0948431860001000124210200001000051821 00AAC5414011352639NNNNNNNNNNNN00000
04 17198072510405609%C0948431920001000124200020001000051821 00AAC5415521353217NNNNNNNNNNNN00000
04 17298072510410709%C0948431920001000124191100001000051821 00AAC5417271353709NNNNNNNNNNNN00000
04 17398072510411809%C0948431920001000124175480001000051821 00AAC5419241354307NNNNNNNNNNNN00000
04 17498072510412909%C0948431920001000124164940001000051821 00AAC5421071354822NNNNNNNNNNNN00000
04 17598072510413909%C0948431920001000124155360001000051821 00AAC5422461355324NNNNNNNNNNNN00000
04 17698072510415209%C0948431860001000124143740001000051821 00AAC5424421355923NNNNNNNNNNNN00000
99
```

Owner: APLS/CRGB/MAL
Version No.: 1.4

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008

Doc. No.:

ARCS/ORCS: 10030-06-004

44

Appendix B – Sample Film Record file

File: B97018.REC

01,15BCB97018,B-041-E-97,HMP,Cessna TurboProp 441,C-GPSP,124281,00159.979,2408,
001,002,19970719,0040000,Prince George,NRL 19-3-93-1,NS-1 118866,111615,HF-3,0091-001,199911,
No Turbulence,1/8 Cumulus,0916,1123,19970722,Kodak Versamat 11,Kodak Type A,
0090,F,009.0,002,Kodak Type A,001.460,19970730,19970729,19970805,S. Drouin,J. Desrochers,
D. Huntington,P. Marquis,M. Forest,M. Forest,B. Laberge,"Clouds forming on west end of line",
02,83D,
02,93A,
03,0,0,,0,,,,,,,Clearing frames,
03,0,6,,0,,,,,,,
03,1,0,0916,28000,115,005.6,0,108,090,Start,,
03,39,38,0930,0,,,,,,End,,
03,40,39,0935,28000,115,005.6,0,109,270,Start,,
03,70,69,0947,0,,,,,,Off,At 119 deg 39 min,
03,0,71,,0,,,,,,,L-109 Removed,
03,0,76,,0,,,,,,,
03,71,78,0956,28000,115,005.6,0,110,090,Start,,
03,109,116,1010,0,,,,,,End,,
03,110,117,1017,28000,115,005.6,1P,105,270,Start,,
03,128,135,1024,0,,,,,,End,,
03,129,136,1028,28000,125,005.6,1S,104,090,Start,,
03,147,154,1035,0,,,,,,End,,
03,148,155,1041,28000,125,005.6,1P,103,270,Start,,
03,166,173,1048,0,,,,,,End,,
03,167,174,1052,28000,125,005.6,1S,102,090,Start,,
03,185,192,1059,0,,,,,,End,,
03,186,193,1104,28000,125,005.6,1P,101,270,Start,,
03,204,211,1111,0,,,,,,End,,
03,205,212,1117,28000,125,005.6,1S,100,090,Start,,
03,223,230,1123,0,,,,,,End,,
01,15BCB97018,B-041-E-97,HMP,Cessna TurboProp 441,C-
GPSP,124281,00159.979,2408,002,002,19970719,0040000,Prince George,NRL 19-3-93-1,
NS-1 118866,111615,HF-3,0091-001,199911,Very light Turbulence,1/8 Cumulus,
1128,1135,19970722,Kodak Versamat 11,Kodak Type A,0090,F,009.0,002,Kodak Type A,
001.460,19970730,19970729,19970805,S. Drouin,J. Desrochers,D. Huntington,P. Marquis,M. Forest,
M. Forest,B. Laberge,"",
02,83D,
02,93A,
03,224,231,1128,28000,125,005.6,1P,99,270,Start,,
03,242,249,1135,0,,,,,,End,,
03,0,251,,0,,,,,,,L-105- Removed,
03,0,259,,0,,,,,,,
03,0,260,,0,,,,,,,Scrap Removed,
03,0,267,,0,,,,,,,
03,0,268,,0,,,,,,,Clearing frames,
03,0,278,,0,,,,,,,

Appendix C – Sample Daily Progress File

File: PIM980720.DPG

98123,19980718,N,21,0001,504502.5000,1213322.6000,0073,504502.5000,1220355.8000,000127.50,73,

98123,19980718,Y,22,0089,504856.3000,1222041.8000,0001,504856.3000,1213322.6000,000145.90,89,

98042,19980719,Y,8,0001,553320.4000,1195719.8000,0027,553318.0000,1203043.8000,000034.99,27,

98042,19980719,Y,7,0026,553150.4000,1202959.4000,0001,553158.8000,1195711.4000,000034.38,26,

98042,19980719,Y,10,0001,553553.4000,1200853.4000,0020,553558.2000,1203327.6000,000025.71,20,

98042,19980719,N,11,0020,553711.4000,1203337.8000,0005,553710.8000,1201511.4000,000019.28,15,

Owner: APLS/CRGB/MAL
Version No.: 1.4
Doc. No.:

Title: Specifications for Aerial Photography Database Files
Issue Date: April, 2008   Reviewed Date: April, 2008
ARCS/ORCS: 10030-06-004

46

Appendix D – Sample UTM Data File

File: B98012.UTM

```
15BCB98012 001 245 980801 601101.681848 554632.2849N 0.150 1261832.0082W 0.150 7835.710 0.300 -7.440 7843.150 6184387.257 668786.845 6186065.687 292480.086 9999999.999 999999.999
15BCB98012 002 246 980801 601128.386162 554631.0322N 0.150 1261450.7242W 0.150 7834.226 0.300 -7.430 7841.656 6184500.050 672642.577 6185844.486 296331.742 9999999.999 999999.999
15BCB98012 003 247 980801 601155.539518 554629.0354N 0.150 1261105.7811W 0.150 7836.029 0.300 -7.390 7843.419 6184595.866 676562.971 6185600.785 300246.218 9999999.999 999999.999
15BCB98012 004 248 980801 601180.785716 554630.5936N 0.150 1260736.2389W 0.150 7837.193 0.300 -7.310 7844.503 6184793.933 680210.599 6185482.568 303897.637 9999999.999 999999.999
15BCB98012 005 249 980801 601204.622373 554630.1335N 0.150 1260418.3025W 0.150 7836.572 0.300 -7.260 7843.832 6184924.151 683658.586 6185314.026 307344.161 9999999.999 999999.999
15BCB98012 006 250 980801 601228.451977 554629.7225N 0.150 1260100.7631W 0.150 7840.296 0.300 -7.240 7847.536 6185058.328 687099.553 6185150.042 310783.926 9999999.999 999999.999
15BCB98012 007 251 980801 601251.790206 554630.6903N 0.150 1255746.6087W 0.150 7838.944 0.300 -7.240 7846.184 6185235.251 690479.656 6185033.914 314166.643 9999999.999 999999.999
15BCB98012 008 252 980801 601275.626402 554628.9977N 0.150 1255428.7354W 0.150 7841.481 0.300 -7.300 7848.781 6185335.500 693928.087 6184835.495 317610.691 9999999.999 999999.999
15BCB98012 009 253 980801 601577.190926 553425.9589N 0.150 1255620.1466W 0.150 7844.312 0.300 -7.880 7852.192 6162908.671 692974.411 6162575.918 314723.036 9999999.999 999999.999
15BCB98012 010 254 980801 601605.597768 553427.3310N 0.150 1255939.8066W 0.150 7842.222 0.300 -7.970 7850.192 6162798.291 689477.392 6162767.728 311229.607 9999999.999 999999.999
15BCB98012 011 255 980801 601637.693649 553428.3832N 0.150 1260324.9007W 0.150 7840.531 0.300 -8.050 7848.581 6162661.920 685535.552 6162972.038 307290.644 9999999.999 999999.999
15BCB98012 012 256 980801 601669.807662 553428.8067N 0.150 1260710.6607W 0.150 7841.779 0.300 -8.030 7849.809 6162509.192 681582.839 6163160.999 303339.293 9999999.999 999999.999
15BCB98012 013 257 980801 601701.011849 553429.8552N 0.150 1261051.0622W 0.150 7838.550 0.300 -7.920 7846.470 6162383.161 677723.095 6163368.544 299482.733 9999999.999 999999.999
15BCB98012 014 258 980801 601731.353463 553429.8107N 0.150 1261425.2688W 0.150 7837.734 0.300 -7.770 7845.504 6162231.074 673973.130 6163540.660 295733.171 9999999.999 999999.999
15BCB98012 015 259 980801 601761.264170 553429.8144N 0.150 1261755.5489W 0.150 7838.154 0.300 -7.580 7845.734 6162086.367 670291.777 6163714.215 292052.484 9999999.999 999999.999
```