ClearFlite®

Airfield Obstruction Identification Tool

ELECTRONICS & INTEGRATED SOLUTIONS

BAE SYSTEMS

Introduction

Accurate identification of airfield obstructions

Safe aviation requires detailed, accurate information about objects that penetrate the 3D Obstruction Identification Surface (OIS) around the world's airports.

Analysts need data that is spatially and temporally accurate to identify those entities that could cause problems for aircraft. The data is used to generate the complex airspace surface models defined by the Federal Aviation Administration (FAA), National Geospatial-Intelligence Agency (NGA), and International Civil Aviation Organization (ICAO), and is delivered to air traffic controllers, who use the electronic data and maps to maintain safe approaches and take-offs.

What is ClearFlite?

Sophisticated 3D feature extraction tool

Automatic generation of the OIS

ClearFlite is a digital mapping tool developed for the aviation industry to help users:

- View 3D stereo images of runways and airfields
- Automatically generate OISs for single and multiple runways
- Identify and measure airfield and runway obstructions
- Export data to third-party geographic information systems (GIS) and 3D visualization applications

Why use ClearFlite?

FAA
NGA
PANS-OPS

ClearFlite provides a highly efficient means to identify, collect, attribute, and store obstruction information for the FAA, NGA, and ICAO PANS-OPS surface geometries.

Existing and new runways

Updated obstruction information can be obtained for existing runways and the optimal location for a new or extended runway may be determined.

Custom surfaces

In addition to the standard surface definitions, custom surfaces can be defined to provide for maximum flexibility with non-standard and non-commercial uses.

GPS
GNSS
RNAV

The ClearFlite information also allows for the implementation of enhanced GPS/GNSS/RNAV (Global Positioning System/Global Navigation Satellite System/Remote Area Navigation) procedures which will significantly reduce fuel costs due to more precise flight routes.

Who uses ClearFlite?

Used by mapping and engineering companies, consultants, planners, and end-users of the OIS data

ClearFlite is used by photogrammetric and engineering organizations as an extension to their normal mapping activities. This allows them to collect the obstruction data directly.

ClearFlite is also used by entities that traditionally have had no photogrammetric expertise, but have the desire or requirement for the quality control and management of the obstruction surface information.

How is ClearFlite used?

Georeferenced imagery

Using georeferenced stereo imagery (i.e., overlapping imagery that is related to a ground coordinate system, viewable in 3D, and from which accurate measurements can be made), the existing or proposed runway endpoints are either visually digitized or are specified by manually-entered XYZ coordinates. From these runway endpoints, the specific OIS is generated automatically and displayed as straight lines and curves in 3D over the imagery. The user controls the measurement cursor by means of a special 3D mouse, or some other control device. Stereoscopic viewing is facilitated by special hardware, for example graphics cards, displays and eyewear. BAE Systems can recommend or supply all necessary hardware.

Importing existing obstruction data, DTM, and LiDAR points

Existing obstruction data, Digital Terrain Model (DTM), and Light Detection and Ranging (LiDAR) data can also be imported for use. Depending on the location of the airfield, terrain database files may be freely available. For example at http://seamless.usgs.gov, U.S. and international data can be downloaded. New obstruction entities can then be identified and digitized; old or existing data can be reviewed for accuracy and validation.

ClearFlite is able to compare the DTM and LiDAR data to the OIS and automatically highlight all areas and points that penetrate the surface.

Data collection and validation

The ClearFlite operator visually identifies terrain and features that penetrate through the OIS. Using the standard ClearFlite collection tools, the operator digitizes and records the XYZ coordinates of the entities together with the basic attributes. For a typical airport runway, the identification, collection and attribution of the obstructions can be accomplished in approximately 8 – 10 hours.

As the obstruction entities are identified, the information associated with these objects can be written to a feature database file and/or to an ASCII log file. The 3D “floating” cursor and tracking window change color from ***green*** to ***red*** as an immediate indicator if an object is *above* the obstruction surface, or vice versa.

Data output

The database file can be translated to DXF or shapefile format and the ASCII log file can be parsed to another desired format. DXF is a common format that allows for data exchange with AutoCAD and many other CAD systems; shapefiles are typically used to exchange information with ESRI® ArcInfo®.

What happens to the ClearFlite data?

Airfield Mapping Database (AMDB) new procedure

After ClearFlite has been used to collect and attribute the obstruction data accurately, those attributed entities form the basis for the Airfield Mapping Database (AMDB) and subsequent creation of a new procedure.

Typical AMDB lifecycle and data flow

The lifecycle of the AMDB can be summarized as follows:

a) An airport has an old airfield procedure
b) The terrain and obstacles are collected photogrammetrically and attributed using ClearFlite
c) Using the ClearFlite spatial and attribution data as a foundation, the AMDB is created by adding other operationally significant objects
d) From the AMDB the new procedure is developed by the CAA, Air Force or third-party company
e) The new procedure is tested by the CAA, Air Force or airline; if the new procedure fails its test, steps b, c and d are repeated
f) The new procedure is implemented by the CAA, Air Force or airline

How to obtain ClearFlite

ClearFlite software module within SOCET SET

For new users of SOCET SET®, a "ClearFlite Bundle" is available from BAE Systems that includes the Core, Stereo, and ClearFlite modules of SOCET SET: these are sufficient to provide a complete ClearFlite system. Existing SOCET SET users can purchase ClearFlite as an add-on module to their existing software.

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ClearFlite functionality is available in SOCET SET, a photogrammetry software package developed by BAE Systems.

BAE Systems Geospatial eXploitation Products (GXP), located in San Diego, California, is the developer and supplier of SOCET SET and SOCET GXP™ software for the worldwide geospatial information and imagery exploitation markets. GXP is a line of business (LOB) within BAE Systems National Security Solutions chartered to provide imagery exploitation products for both government and commercial imagery processing applications.The information in this document is subject to change.

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