

# Global Literature on Aircraft: Scientometric analysis

SHYNEE MARTIN<sup>1</sup>; V.GEETHA<sup>2</sup>; P.JAEQILINE NIRMALA<sup>3</sup>

Research Scholar & Chief Librarian, PG & Research DLIS, Bishop Heber College, Trichy -620 017,

SNS College of Engineering, Coimbatore – 641 107<sup>1</sup>;

Assoc. Professor (Rtd), PG & Research DLIS, Bishop Heber College, Trichy -620 017<sup>2</sup>;

Deputy Librarian, Central Library, Karunya University, Coimbatore – 641 114<sup>3</sup>

## ABSTRACT

The present study examines the analyses of the Aircraft research output from in and around the world during 2006-2015 as reflected in SCOPUS database. SCOPUS database has been used to retrieve the data for 10 years (2006-2015) by search string is Aircraft. A total of 65275 records are retrieved and exported to the MS –Excel. Totally 65275 records were retrieved from the database. Scientometrics tools used with different parameters including the growth, global publications, contribution of major collaborative countries, most productivity institutions, contribution of various subject field's most productive journal and Degree of Collaboration have been employed. Type of document has been analyzed. Further, we recognized top 10 most preferred journals by the Indian scientists and highly productive Indian institutions.

**Keywords:** Bibliometric, Scientometrics SCOPUS

database, Aircraft, Research

## 1. INTRODUCTION

Pritchard<sup>1</sup> defined Bibliometric as “*the application of mathematical and statistical methods to books and other media of communication*”, while Nalimov and Mulchenko<sup>2</sup>

defined Scientometrics as “*the application of those quantitative methods which are dealing with the analysis of science viewed as an information process*”. This research analyzed Aircraft research literature during the period from 2006-2015. Records for the analysis have been extracted from SCOPUS database with a sample of 65275 records. Scientometric studies are appropriate to trace the total research output on Aircraft globally. An **aircraft** is a machine that is able to fly by gaining support from the air. It counters the force of gravity by using either static lift or by using the dynamic lift of an airfoil,<sup>[1]</sup> or in a few cases the downward thrust from jet engines. The human activity that surrounds aircraft is called *aviation*. Crewed aircraft are flown by an onboard pilot, but unmanned aerial vehicles may be remotely controlled or self-controlled by onboard computers. Aircraft may be classified by different criteria, such as lift type, aircraft propulsion, usage and others. The

present study in the scientometric analysis on Aircraft will bridge the gap.

## 2. OBJECTIVES OF THE STUDY

- The major objectives are framed with the exclusive notion of the present study as mentioned below:
- To examine the growth of research productivity of Aircraft research during 2006- 2015.
- To identify the Document type and Journal distribution of publications in Aircraft.
- To study the subject-wise breakup of publications.
- To identify country-wise distribution of publications.
- To assess the Form of Communication and Language wise research concentration of Aircraft.

## 3. METHODOLOGY

The required data was collected from the SCOPUS database. Scopus is the largest abstract and citation databases of research publication and quality web resources. A total of 65275 records were analyzed by using the Excel software with application as per the objectives of the study.

## 4. REVIEW OF LITERATURE

Sooryamoorthy R, (2010)<sup>3</sup>, had analyzed medical publications for three decades and at regular intervals (1975–2005) from the SCI database. This paper pioneers an attempt to find out whether the reported pace of growth in the production of scientific papers in medicine is an effect of partnerships that scholars have with their counterparts within the organization, within the country, or with those in other countries.

Ball, E, McLoughlin, M, and Darvill, A, (2011)<sup>4</sup>, examined the qualitative that stands up to independent rather than comparative scrutiny. The results show that out of the 240 papers analysed, 27 used ad hoc or no references to qualitative; methodological terms such as thematic analysis or constant comparative methods were used inconsistently; qualitative was a catch-all panacea rather than a methodology with well-argued terms or contextual definition.

Prathap, G and Gupta, B M, (2011)<sup>5</sup>, analyzed the performance of education and research institutes in India in medical and allied sciences during 1999-2008, based on their research output, using robust quantitative and qualitative indicators which give a more rational procedure for ranking their research performance. The data was collected from the SCOPUS database and a new composite

performance indicator, the p-index, is used to measure performance.

Cantos-Mateos, G, et al., (2012)<sup>6</sup>, found the dual analysis of Spain's scientific output in this field during the period 1997-2007. This study provides an overview of Spanish research involving stem cells, detecting and representing the main areas of research.

Jeyasekar and Saravanan (2012)<sup>7</sup>, conducted a Scientometric study of forensic science to analyze the growth in literature, authorship productivity, the high ranking institution and country. It was found that the forensic science literature doubled between 2001 and 2011. In the same year, it could be observed that the forensic science publications are found not only in the core journals but also found scattered among journals of allied fields.

Narotsky D, Green PH, Lebwohl B. (2012)<sup>8</sup>, attempted the rate of CD publication output, comparing it with other gastrointestinal conditions, and to assess for changes over time. They used an iterative search process to identify all articles in PubMed from 1980 to 2009, and compared the number of publications featuring CD to Crohn's disease and Helicobacter pylori. The study analyzed CD publication output with respect to its degree of diffusion among journals and authors, and assessed an association between economic parameters and output. The study reveals that, the number of publications in CD is increasing, out of proportion to the overall growth of the peer-reviewed medical literature. CD publications are spread throughout a larger number of journals, but are more dominated by high-volume authors. Economic factors are associated with national contributions to the world literature in CD.

Baskaran, C (2013)<sup>9</sup>, studied the research publication of Alagappa University in the field of science and technology. This study discusses on discipline-wise and institution-wise collaboration and ranking of authors in research contribution of Alagappa University during 1999-2011. Relative growth rate (RGR) was found to be fluctuating trend during the study period. The Doubling time (DT) was found to be an increased and decreased trend in this study. Degree of collaboration and its' mean value is found to be 0.963. The top three institutions with Alagappa University are Central Electro Chemical Research Institute, National Cheng King University, and Anna University.

Baskaran, C, (2012)<sup>10</sup>, examined that research growth, relative growth rate and doubling time of publications, institution wise and ranking of authors in research productivity of Graph theory during 2004-2011. The average number of papers published per year was 910.75 during the period. The highest numbers of papers were published above thousand during the years 2009 to 2011. It

is observed RGR has been increased and decreased from 2005 (0.113) to 2011 (0.057).

## 5. DATA ANALYSIS AND INTERPRETATIONS

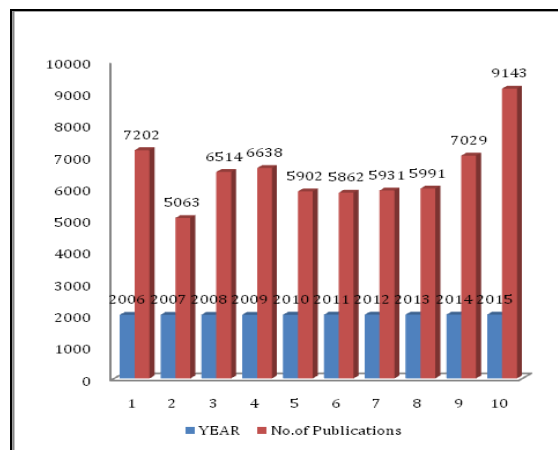
### 5.1 Year wise Distribution of Publication on Aircraft Research

The year wise distribution of literature on Aircraft is shown in Table 1.

**Table 1. Year wise Distribution of Literature**

Year	No. of Publications	%	Cumulative	Cum. %
2006	7202	11.03	7202	11.03
2007	5063	7.76	12265	19.69
2008	6514	9.97	18779	28.77
2009	6638	10.17	25417	38.94
2010	5902	9.04	31319	47.98
2011	5862	8.98	37181	56.96
2012	5931	9.09	43112	69.23
2013	5991	9.18	49103	75.22
2014	7029	10.77	56132	85.99
2015	9143	14.01	65275	100
<b>Total</b>	<b>65275</b>	<b>100</b>		

It is seen from Table 1 that the year 2015 has recorded a maximum number of records (9143). The number of records published year wise shows a fluctuation trend (Fig.1). A sum of 65275 records was published on Aircraft covered in the Scopus database.



**Fig 1 : Year wise Distribution of Literature**

### 5.2 Subject wise Distribution of Literature

Table 2 shows that the top 10 subjects includes articles / authors on Aircraft which are available in the Scopus database during the period of 2006-2015. As per the subject available the highest number of productivity in Engineering subject (48346) followed by Computer Science (11556), Physics and Astronomy (7890) rest of the subjects were listed in the Table 2.

**Table 2. Subject wise Distribution of Literature**

S.No	Subject Area	No. of Publications	% of 65275
1	Engineering	48346	74.06
2	Computer Science	11556	17.70
3	Physics and Astronomy	7890	12.08
4	Materials Science	7419	11.36
5	Mathematics	5802	8.88
6	Earth and Planetary Sciences	5702	8.73
7	Medicine	3047	4.66
8	Energy	2865	4.38
9	Environmental Science	2759	4.22
10	Social Sciences	2719	4.16

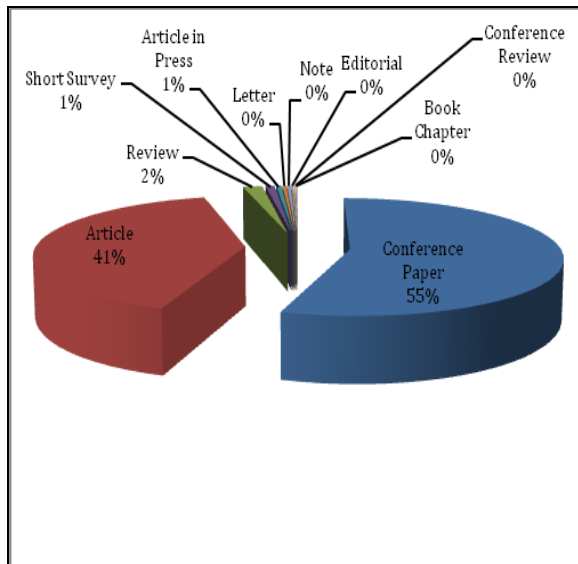
### 5.3 Document Type of Literature

The document wise distribution of literature is indicated in Table .3(Figure 2). In overall records (65275) on Aircraft research in global over a period of Ten years from 2006 - 2015. Out of them, Conference Papers shown a predominant contribution (55.16%), followed by Articles (40.78%) and

Reviews (1.7%). The least contributions have shown in Book Chapters (0.13%).

**Table 3. Document type of Literature**

S.No	Document Type	No. of Publications	Percentage
1	Conference Paper	36005	55.16
2	Article	26617	40.78
3	Review	1112	1.70
4	Short Survey	513	0.76
5	Article in Press	290	0.47
6	Letter	223	0.35
7	Note	204	0.32
8	Editorial	125	0.19
9	Conference Review	100	0.15
10	Book Chapter	86	0.13
	Total	65275	100.00



**Fig 2: Document type wise Distribution of Literature**

**5.4 Source Title wise Distribution of Literature**

In related to this study, a proceeding is one of the primary source titles of information are the vehicles of current output of knowledge in Aircraft. Table 4 shows top 15 rank source title according to their productivity. It is evident from the table to identify the proceedings Of SPIE The International Society For Optical Engineering ranked first in order to published 1161 papers, proceedings of The ASME Turbo

Expo occupied second in order published 1045 papers during the period of study. The Journal Of Aircraft ranked third in order published 879 papers.

**Table 4. Source Title wise Distribution of Literature**

S.no	Source Title	No. of Publications	%
1	Proceedings Of SPIE The International Society For Optical Engineering	1161	1.78
2	Proceedings Of The ASME Turbo Expo	1045	1.60
3	Journal Of Aircraft	879	1.35
4	AIAA IEEE Digital Avionics Systems Conference Proceedings	843	1.29
5	Applied Mechanics And Materials	821	1.26
6	SAE Technical Papers	792	1.21
7	Jane S Defence Weekly	721	1.10
8	Annual Forum Proceedings AHS International	715	1.09
9	Advanced Materials Research	700	1.07
10	Hangkong Xuebao Acta Aeronautica Et Astronautica Sinica	658	1.01
11	Aviation Week And Space Technology New York	555	0.85
12	Collection Of Technical Papers AIAA ASME ASCE AHS ASC Structures Structural Dynamics And Materials Conference	539	0.83
13	Jane S Defence Industry	485	0.74
14	Hangkong Dongli Xuebao Journal Of Aerospace Power	463	0.71
15	Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics	423	0.65

**5.5 Keyword wise Distribution of Literature**

To determine the most common keywords used through out to the study period (2006 -2015) in the Aircraft literature,

each keyword occurrence is found out and ranked. The following Table 5 shows the Top 15 keywords and the keyword Aircraft holds the first rank and used frequently in the literature study.

**Table 5. Keyword Distribution of Literature**

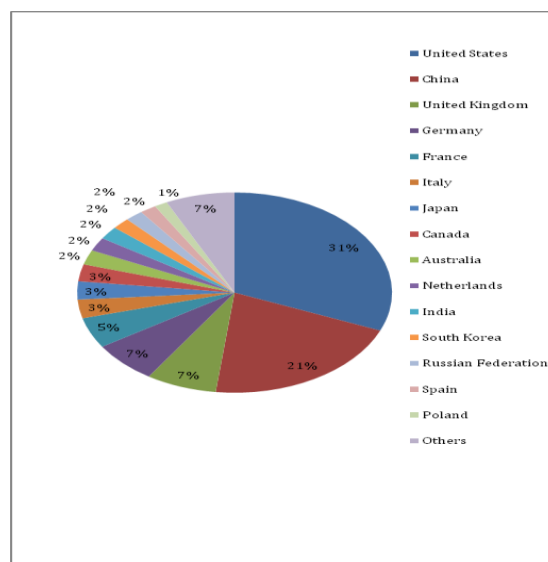
S.no	Keyword	No. of Publications	%
1	Aircraft	23965	36.71
2	Fighter Aircraft	6882	10.54
3	Aircraft Control	6391	9.79
4	Aircraft Engines	5972	9.15
5	Computer Simulation	4771	0.73
6	Aerodynamics	4562	6.98
7	Design	3418	5.24
8	Optimization	3299	5.05
9	Algorithms	3066	4.69
10	Aircraft Accidents	3065	4.69
11	Flight Control Systems	3053	4.67
12	Unmanned Aerial Vehicles (UAV)	2965	4.54
13	Article	2964	4.54
14	Aviation	2786	4.26
15	Human	2610	3.99

**5.6 Prolific Countries**

It is evident from the database Table 6 (Figure 3); that United States (31.21%) is in the top most places in Aircraft research. The second place is occupied by China (20.70%) publication of research and United Kingdom in third place with 7.24% .The top 15 countries under Aircraft research literature was noted. India stands in 11<sup>th</sup> place with 2.07%.

**Table 6. Prolific Countries with number of papers**

S.no	Country	No. of Publications	%
1	United States	20375	31.21
2	China	13512	20.70
3	United Kingdom	4726	7.24
4	Germany	4395	6.73
5	France	3245	4.97
6	Italy	1983	3.04
7	Japan	1904	2.92
8	Canada	1809	2.77
9	Australia	1547	2.37
10	Netherlands	1438	2.20
11	India	1361	2.07
12	South Korea	1199	1.84
13	Russian Federation	1198	1.84
14	Spain	1097	1.68
15	Poland	866	1.33
16	Others	4620	7.10
Total		65275	100.00



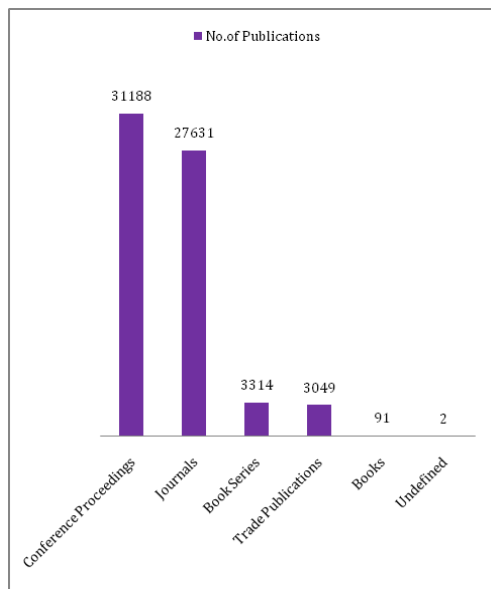
**Fig 3: Country wise Distribution of Literature**

### 5.7 Source Type of Literature

In global research, output on Aircraft has been analysed for its distribution pattern of physical forms of Publications. Table 7 (Figure 4) present the various forms, in which aircraft literature published. This includes Conference Proceedings (47.78%), Journals (42.33%), Book Series (5.08%), Trade Publications (4.67%), Books and Undefined as least percentage. It revealed that, even in the electronic era, the form of communications continues to be very significant vehicle in the process of scientific communication.

**Table 7. Forms of Publication on Aircraft Research**

S.No	Source Type	No. of Publications	%
1	Conference Proceedings	31188	47.78
2	Journals	27631	42.33
3	Book Series	3314	5.08
4	Trade Publications	3049	4.67
5	Books	91	0.14
6	Undefined	2	0.00
Total		65275	100.00



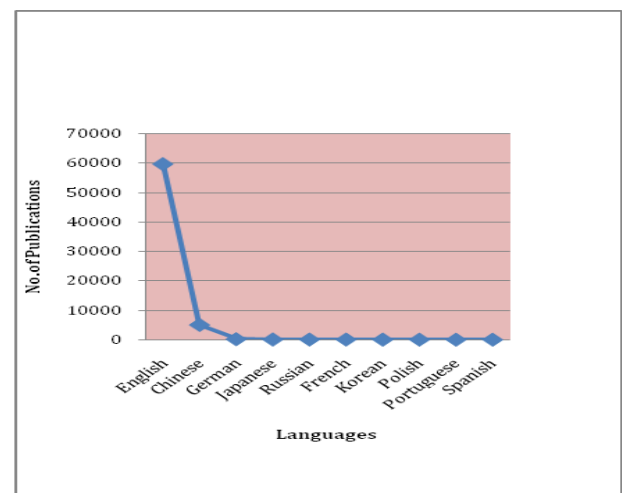
**Fig 4: Forms of Communications**

### 5.8 Language wise Distribution of Literature

It is revealed from the Table 8 and 5 that the highest publication in aircraft research is 59596 (91.29%) papers out of 65275 during the research period 2006 – 2015 in English language. In this study, 10 languages used and the lowest publication of aircraft research papers published is Portuguese (32 papers) and Spanish (32 papers) respectively.

**Table 8. Language of Publication on Aircraft Research**

S.No	Language	No. of Publications	%
1	English	59596	91.29
2	Chinese	5046	7.73
3	German	196	0.30
4	Japanese	103	0.16
5	Russian	85	0.14
6	French	84	0.13
7	Korean	66	0.10
8	Polish	35	0.05
9	Portuguese	32	0.05
10	Spanish	32	0.05
Total		65275	100



**Fig 5: Language wise Distribution of Literature**

## **Conclusion**

The present study is to highlight the growth and development of research productivity in Aircraft. A sum of 65275 publications were during 2006-2015 - Maximum publication published in the year 2015.

The study revealed that United States is a significant country dominating in the Research and Development in Aircraft research. India scored 11<sup>th</sup> rank with 1361 research publications. Aircraft is the main keyword used by the scientist. Related to physical forms of Publications Conference Proceedings (47.78%) used followed by Journals (42.33%). This type of study are the helping tool to analyse the research areas to bridge the gap in future also.

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