



NASA's portfolio is the definition of lean and mean

On 20th July 2019 NASA marked [the 50th anniversary](#) of the Apollo 11 moon landing. The event was a victory for the US – which at the time was battling the Soviets for the upper hand during the Cold War – and delivered on a promise made by President John F Kennedy in early 1963 that the first man on the moon would be an American.

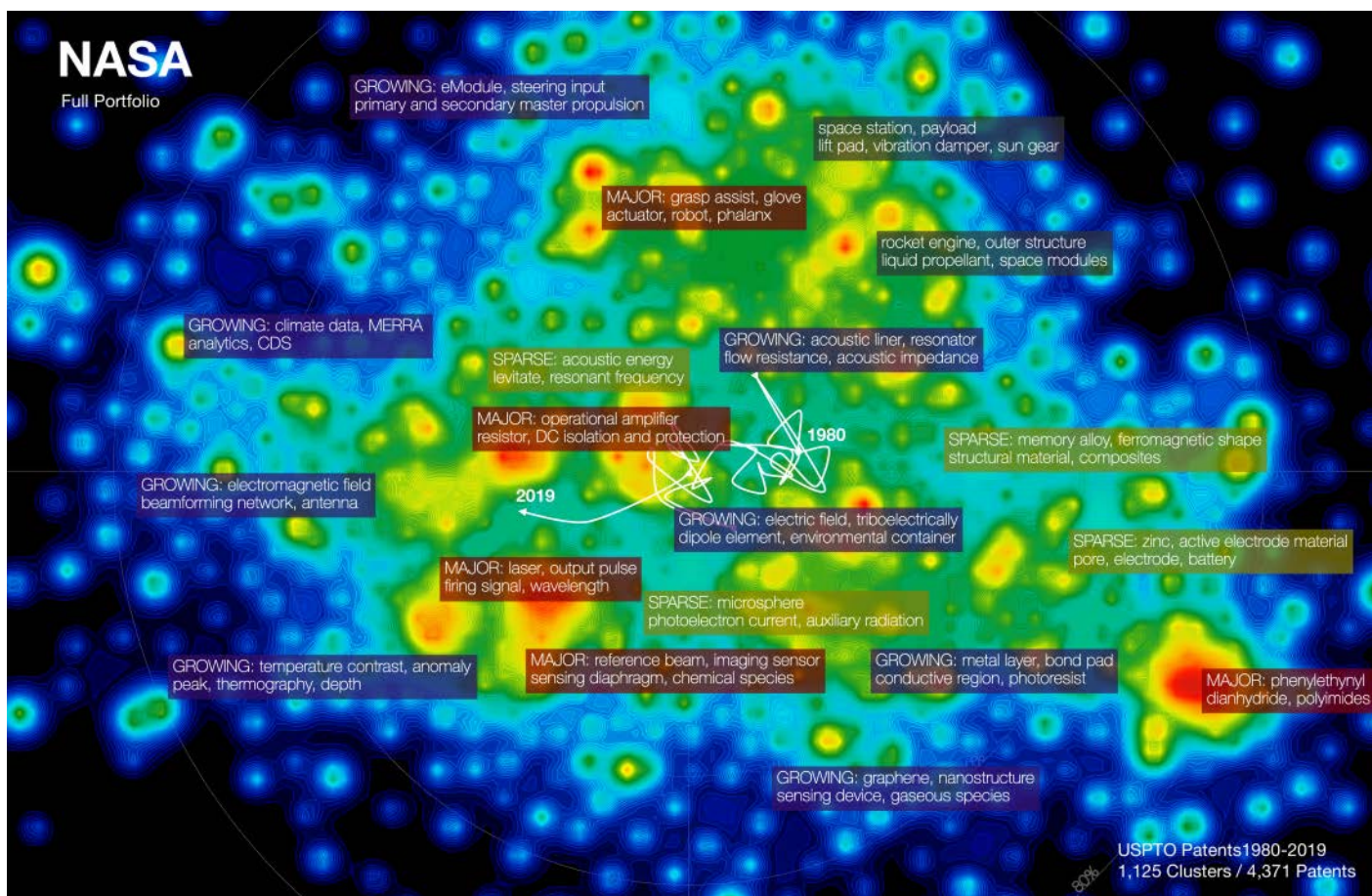
But no matter the political climate – or the administration running the country - NASA has worked to develop and patent inventions which benefit the American taxpayer. Like any business its goals are to create innovative technologies which have market relevance. However, it must do this within the context of the oversight placed on federal agencies. NASA has to prove to the public that its portfolio has commercial potential. Surely all corporate IP counsel can sympathise, as they must also constantly defend company patent holdings to the C-suite.

This week we analyse NASA's portfolio to see how the agency has developed and maintained its holdings over the years. We also address its technology transfer programme and look at the market relevance of its patents.

Portfolio breakdown

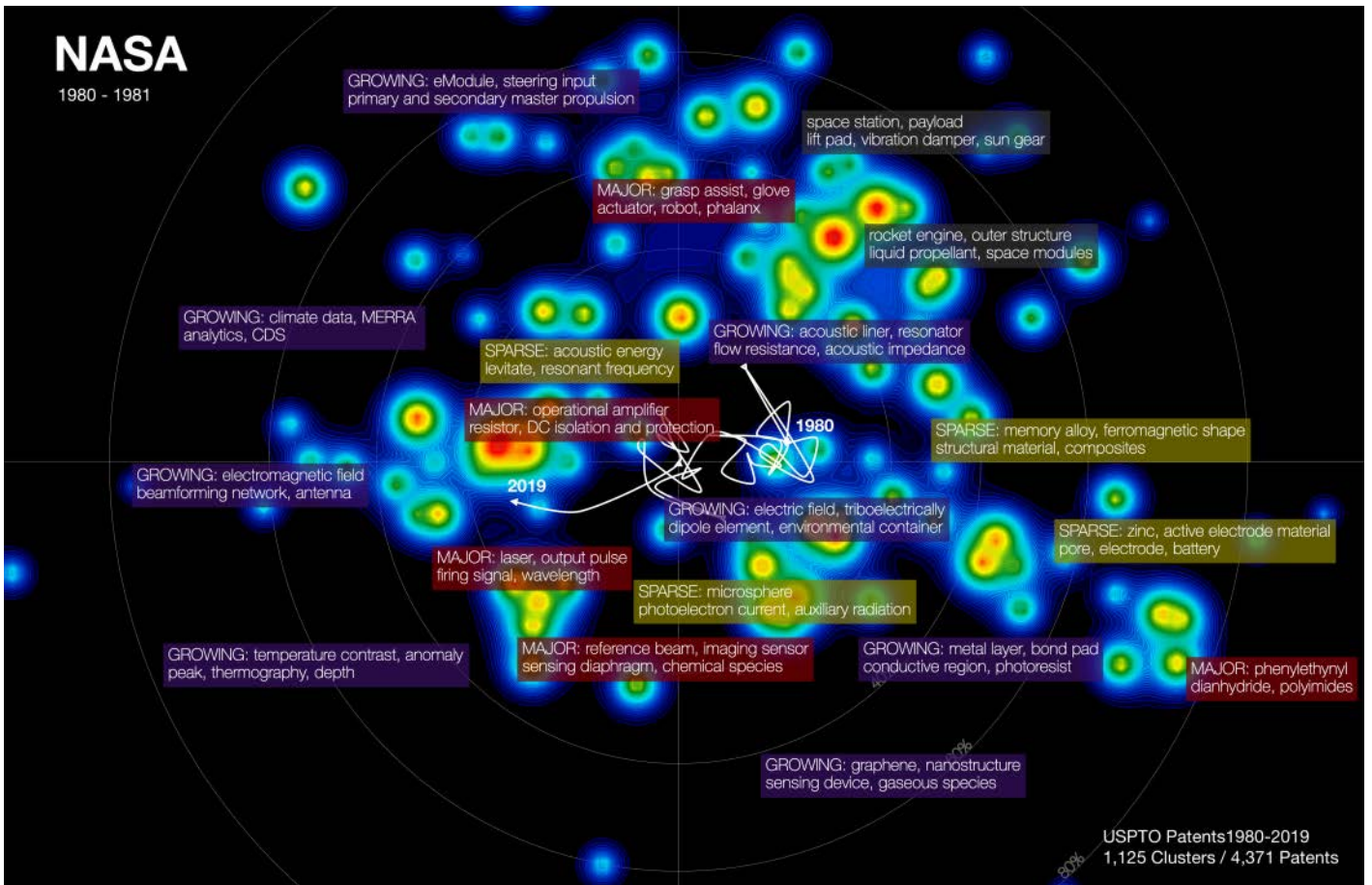
NASA's patent portfolio consists of approximately 1,200 active grants worldwide, according to [Anaqua's AcclaimIP](#). A majority of the portfolio is protected in the US (89.7%). Germany is the second most important jurisdiction, accounting for 3.5%. The space agency files through the EPO occasionally, but this activity is minimal.

The graph below, created by [Valuenex](#), shows the shift in NASA's R&D activity and filing patterns over the past 40 years.



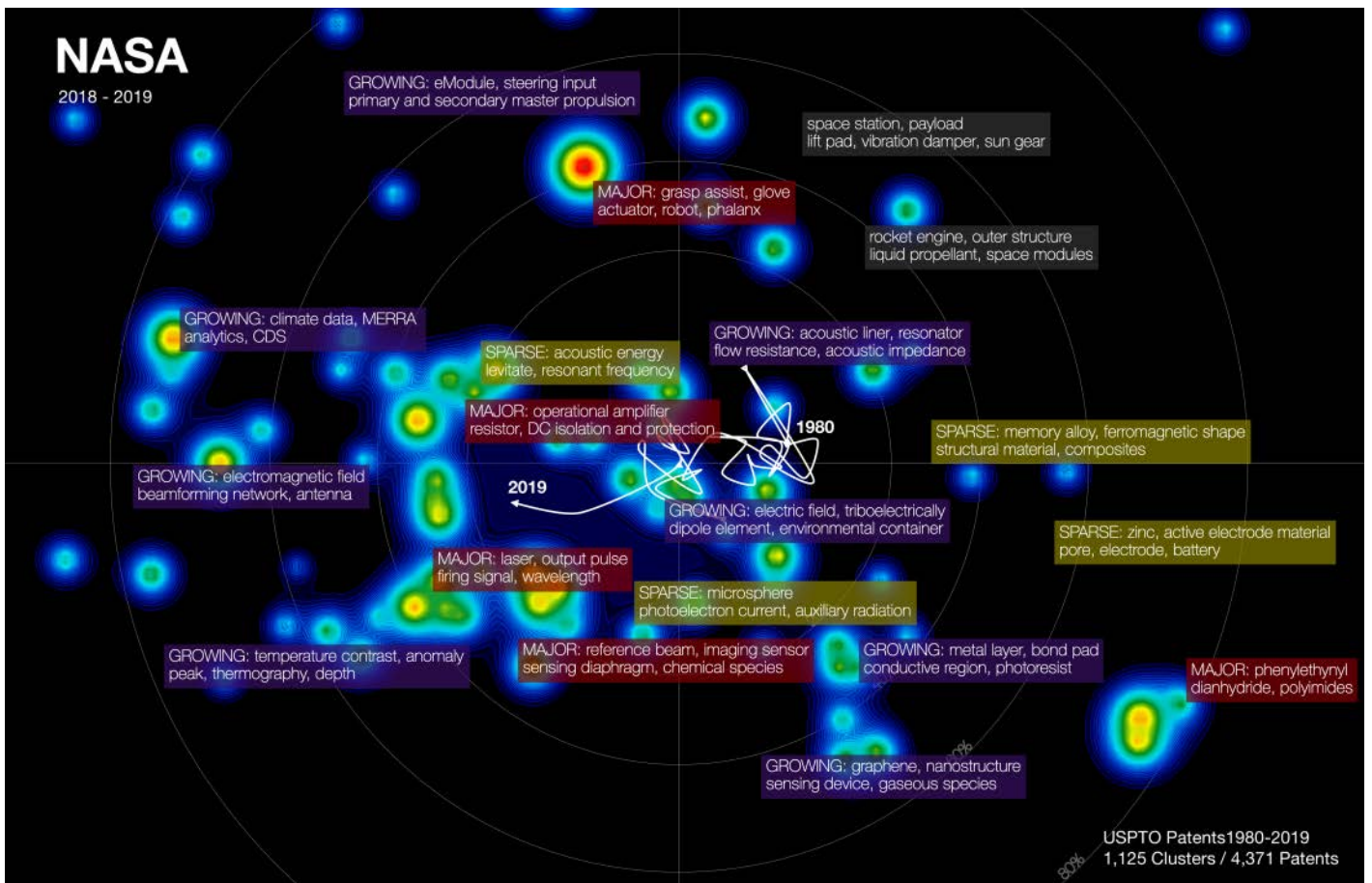
Source: VALUENEX; Note: Data pulled from USPTO with the assignee 'National Aeronautics and Space Administration (NASA)' from 1980 until 31 July 2019. There was a total of 4,371 patents. The full text of these patents was analysed, resulting in 1,125 clusters.

Engines, rockets, the space station, and related materials and components were the main areas of focus for NASA in 1980 and 1981 (see graph below).



Source: VALUENEX

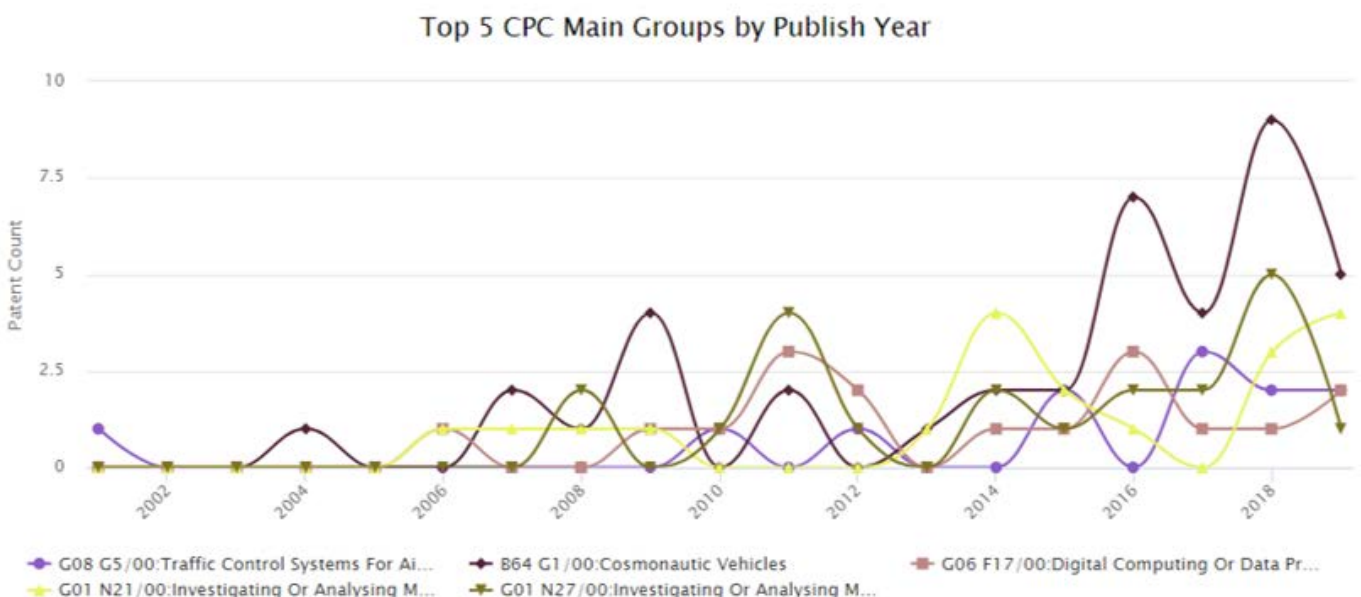
The most recent data shows that NASA is currently investing more in technologies relating to climate monitoring programmes, such as MERRA and CDS, which appear in a growing region in the graph below.



Source: VALUENEX; Note: A growing area is one with relatively faster growth over the last five years compared to other areas.

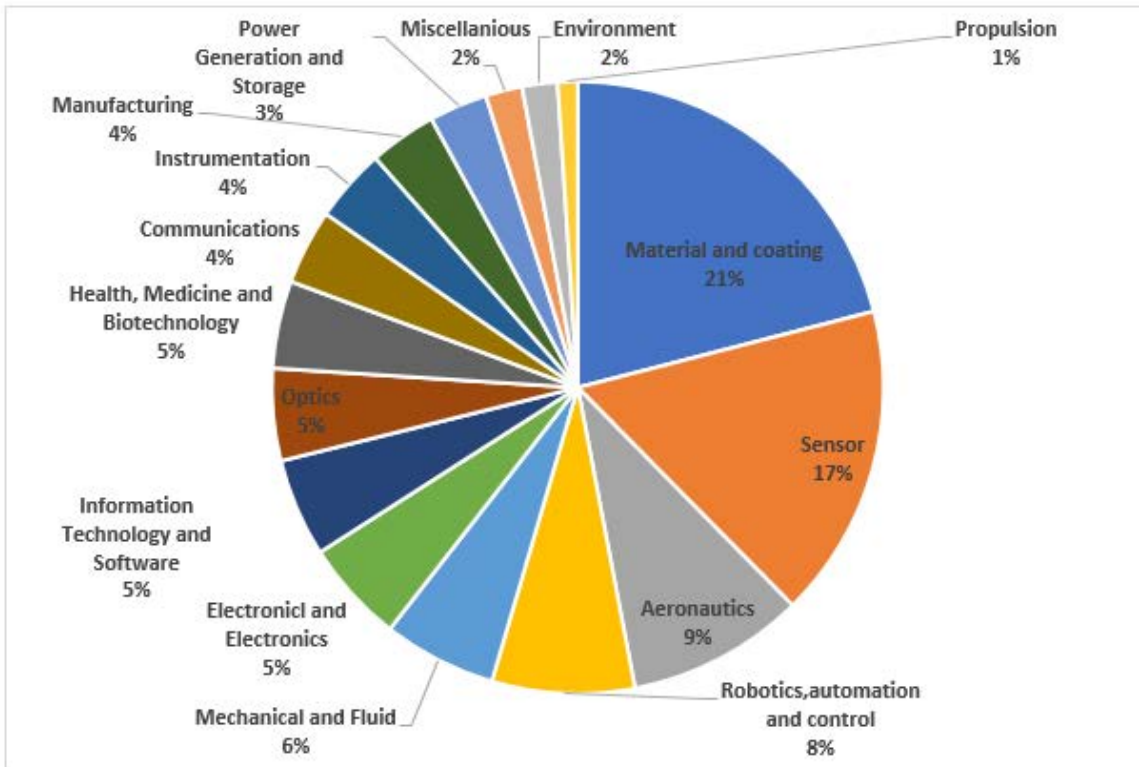
The sparsely populated spaces which appear in these landscapes are technology areas with relatively lower density.

Analysis of the top five CPC codes shows that NASA has recently been filing for technologies relating to aviation traffic control systems, cosmonautical vehicles, digital computing and application of electromagnetic fields and materials, according to analysis conducted by [iRunway](#) (see graph below).



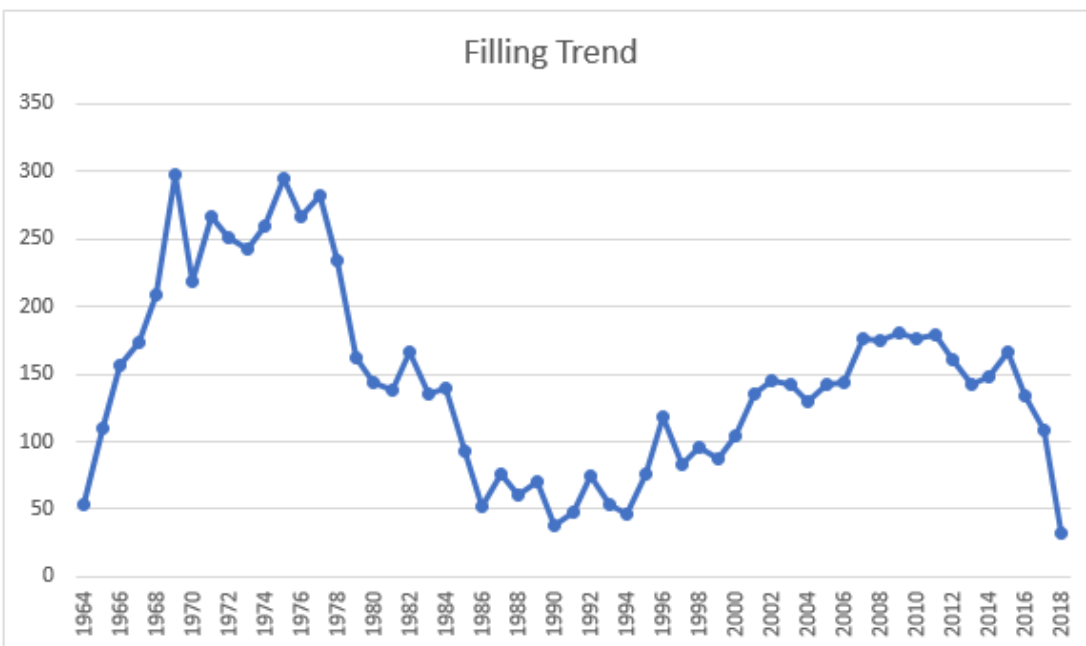
Source: iRunway Analysis using Innography, see full size image [here](#)

In an [audit of NASA's technology transfer process](#) the agency broke down its portfolio into key technologies (see graph below). Patents relating to material and coating account for 21% of the portfolio. Patents reading on sensors and aeronautics represent 17% and 9% respectively.



Source: iRunway Analysis, using NASA's patent data which is accurate as of October 2018

NASA's patent filing over the past decade has generally increased with a few drop-offs in activity (see graph below). Its application output peaked in 1969, coinciding with the Apollo 11 mission. Patent filing decreased significantly after 1978 and did not pick up again until the 1990s. Around 75% of NASA's active patents have been filed in the past 10 years. The downward trend post-2017 may not be an accurate reflection of current activity levels given the 18-month lag between when an application is filed and when it is published.



Source: *iRunway Analysis using Innography patent data*

NASA's technology transfer programme

As a federal agency NASA ultimately answers to the American public. Its goal, then, is to obtain the highest return for taxpayer investment. As such it has strict rules for patents. It will only seek IP protection “on technologies with commercial potential for which NASA has an ownership interest to enable licensing”, according to the [Technology Transfer Process audit report](#). Further, the agency will only patent a technology that can be brought to market within seven years. When it comes to NASA-owned inventions, the [agency reviews](#) these for technical readiness, market viability and patentability.

These specific guidelines may shed some light NASA’s high US patent abandonment rates (see graph below).

US Patent Abandonment Trends



Source: *Anaqua’s Acclaim IP Analytics Software*

Each of NASA’s centres are expected to handle their own technology transfer, which means they must review their innovations and assess the patentability and marketability themselves. In 2018 the Langley Research Center was the largest contributor of NASA patents, accounting for 29% of those issued that year. It is followed by the Glenn Research Center (19%) and Goddard Space Flight Center (18%).

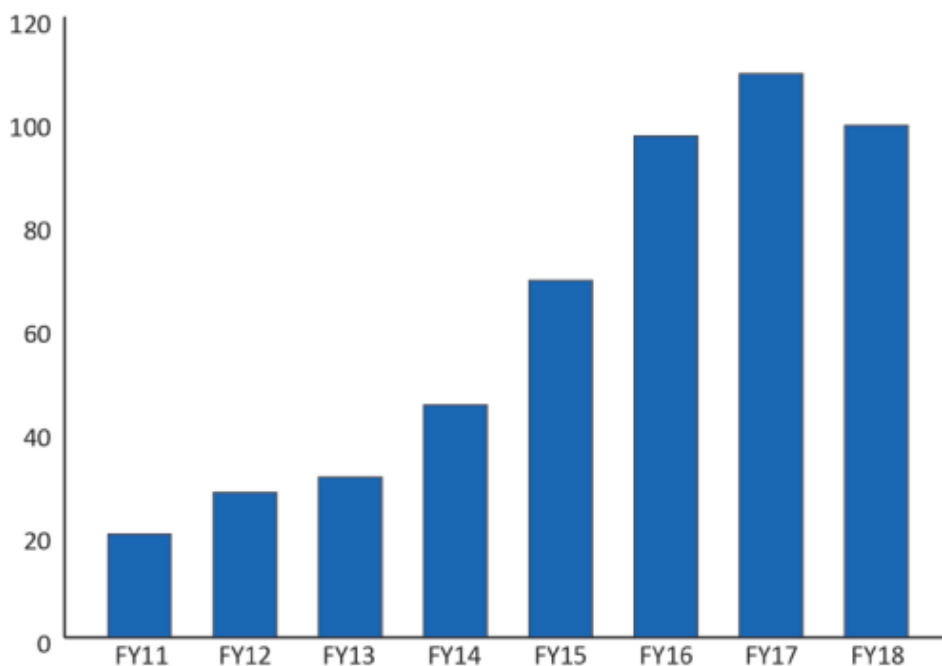
A key aspect of the technology transfer programme is patent licensing. NASA has [made its own patent portfolio available](#) for licensing and also seeks to receive royalty fees from inventions which it has contributed to.

As of October 2017, NASA had 871 issued patents and 364 applications available for licensing. There were also 399 patents already licensed or in joint ownership. Licensees of NASA patents are typically non-aerospace companies. The agency also has a start-up initiative which allows companies to license its patent with no up-front costs.

The FY 2018 [Technology Transfer Program budget](#) has dropped to 30% of its funding level in 2004. Despite the budget cut, there has been a 341% increase in annual licensing totals since 2011.

In 2018, patent licences declined by 9%. This put an end to a six-year period of licence growth.

Figure 6: Patent Licenses Executed, FY 2011-2018

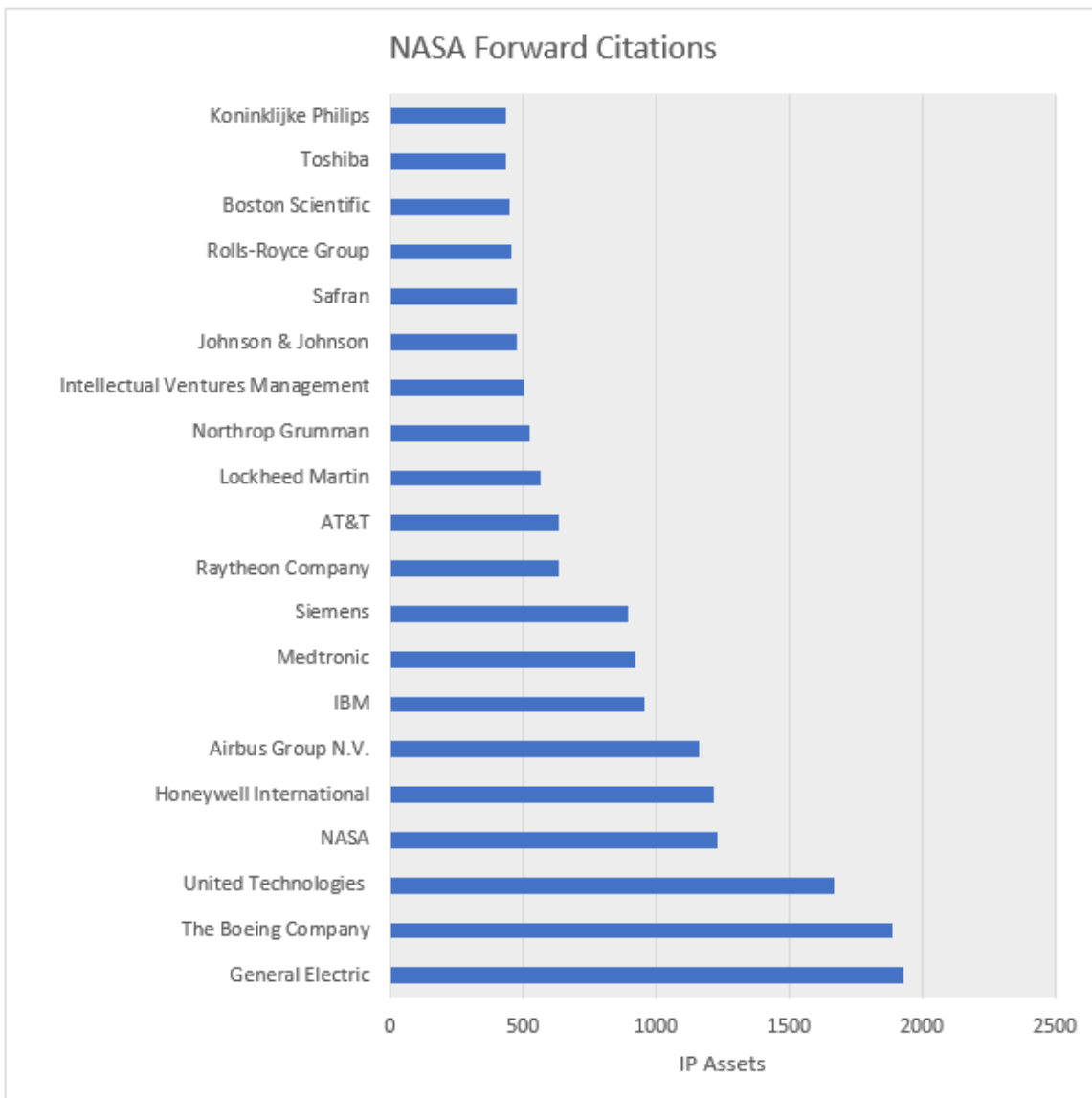


Source: NASA OIG presentation of Agency data.

Source: [NASA's Technology Transfer Process](#); Note: each of the patent licences represents a NASA technology being transformed into a commercial product by a domestic company

Market role

The range of companies citing NASA's patents shows the diversity of technologies within its portfolio (see graph below). Aviation companies, such as Boeing, feature, as do medical technology and electronics companies.



Source: *iRunway Analysis using Innography*

IAM says

NASA is best known for its aeronautics and aerospace research, but it is also an important resource for companies in the US. It has played a role in the development of a number of products, such as memory foam pillows and cell phone cameras, both of which deploy NASA's technologies.

As a federal agency, NASA's goals are different to those of a typical business. While it does seek to profit from royalty payments, it is ultimately accountable to the taxpayer and is therefore extremely selective when it comes to patenting technologies. Furthermore, public oversight requires it to be absolutely transparent with its programmes. This means that it is constantly forced to assess its performance and makes changes to ensure goals are met. While this would seem daunting to many companies, this means that NASA has been able to achieve what many strive for: a streamlined portfolio that is very well aligned with the agency's objectives.