A Survey into the State & Health of the European EO Services Industry

Prepared by EARSC

2017
It is with great pleasure that we bring you the results of the 2017 EARSC (European Association of Remote Sensing Companies) survey of the Earth Observation (EO) services industry. This is the third survey conducted every two years by EARSC. We are very grateful to all the companies that have spent time responding to our questions.

The survey considers EO services companies in Europe and Canada; the latter because of their membership in ESA.

The survey was conducted during the 1st quarter of 2017; figures are for the Financial Year (FY) 2016. EARSC first conducted this survey in 2013 (FY2012) with a second one in 2015 (FY2014). The series of data is allowing a good indication of trends to be developed. A survey was also conducted by others in 2006 and this data is also used to develop longer time series of data. For more information see the EARSC 2013 survey.

EO Services companies are those selling geospatial products which use some satellite data – however small that may be. It comprises data suppliers (satellite operators, ground station operators and resellers), value-adding and GIS companies as well as consultants.

With the goal to help develop the downstream sector, the European Copernicus programme is a very important programme both for European institutions and the industry. Copernicus is evolving with the launch of more Sentinel satellites and the Copernicus Services and a specific part of the survey is dedicated to the business surrounding it.

As always, we shall be delighted to receive comments and feedback which will help us in preparing the next survey which will start at the end of next year (2018).

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The strategic environment for the EO services industry sector continues to evolve rapidly. There are many changes to reflect upon having taken place in the last two years since our last report was published.

More new business ventures with plans to launch new satellite systems were announced. Amongst these are EARSC member Earth-i which will offer new colour video capability from low earth orbit. Other announcements came from Capella Space, Astro-Digital, Geooptiks and SateLogic. Both Spire and BlacksSky re-affirmed their plans and move closer to launching first satellites. Earlier new ventures matured. Planet and UrtheCast launched more satellites and consolidated the assets (Blackbridge/Rapideye and Deimos Imaging respectively) which had been recently acquired at the time of our last survey.

Planet also made progress through the acquisition of TerraBella (previously Skybox) from Google so adding a higher performance capability to sit alongside the Rapideye constellation and their fleet of Doves. More Doves have been launched and in 2017 set the record for the largest number of satellites placed in orbit through a single launch. Google has taken an undisclosed stake in Planet as a result suggesting disposing of TerraBella is a strategic move but not an exit from the satellite geospatial business.

Two further acquisitions took place; both seemingly driven by the US military market. MDA, operator of the Radarsat satellites announced a deal to buy DigitalGlobe. This is still passing regulatory approval but will provide MDA with both radar and optical imaging capacity at high resolution. The deal seems to be mainly motivated to increase MDA position in the US as a key supplier to the DGA. DigitalGlobe had earlier bought Radiant, a supplier of geospatial information products primarily to US government customers.

The second acquisition was in the downstream segment with Harris buying Geographic Information (GI) software supplier Exelis. This appears to be aimed at consolidating Harris position in the US military sector, improving the ability to offer complete mission packages.

In Europe the main changes came on the institutional side with the continued progress of Copernicus with three more satellites launched and the announcement to establish a new Copernicus Services for Data and Information access (DIAS) which would be operated by the private sector. It was also decided that one further DIAS should be set up and operated by the public entity Eumetsat. At this time, announcement of the winners is awaited for the contracts which have the potential to transform the sector in Europe.

But the main change has been the introduction of new platforms, largely cloud-based. Amazon and Google have been leading the way and a number of the leading ones are shown in the table. Several R&D initiatives are also supporting further developments. Not all of the platforms follow the same philosophy. Some are more focused on attracting developers to use their satellite data whilst others are aimed at providing sales channels.

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<td>Planet</td>
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<td>UrtheCast</td>
<td>UrtheCast Platform</td>
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Industrial Landscape

Even if establishing a precise number of companies is an impossible task, our survey indicates that, in 2016, there are around 510 companies active in the domain of EO services in Europe and Canada of which some 460 are in Europe. Our approach is to compile and maintain a list of all the companies which we identify by scanning lists of conference attendees, project teams, news items etc. This has been maintained over the last 5 years. Each company found is checked for relevant activity in EO services before being added.

Adding companies is easy; removing them is more difficult so the list grows steadily and at the time of the launch of the survey (end-2016), stands at 678 named companies in Europe and 48 in Canada. Companies disappear through failure, merger with others or change of business strategy, hence we apply a number of factors to account for the attrition. The list is also cross-checked with local experts in industry or in national administrations leading to the quoted number of 510.

The sector is very fragmented with many small players. The majority of companies - 66% - are micro-sized\(^1\) meaning that they have less than 10 employees. Our approach only uses the number of employees as a filter and not revenues although clearly there is a strong correlation between the two parameters. The percentage of small and micro companies has remained pretty much the same at 95% as it was in 2012 and 2014.

We recognise that this is not fully in accord with the strict definition of an SME\(^2\) since ownership is also a factor. However, we have made a comparison and apart from a few, well-known examples, the large majority are independently owned and the percentages do not change significantly.

The breakdown remains fairly constant over the years even if in the detail it is possible to see some changes going on. The chart left shows the comparison for each class over the 3 surveys conducted. The biggest change is an increase in the number of companies in the micro category. This fits with other evidence where we find a lot of new start-ups being created some of them around the Copernicus programme. We do plan to conduct some more specific research into this trend.

That the ratios remain almost unchanged, suggest that micro companies are growing into small ones, and similarly small into medium. No new large company has emerged since 2009. The changing industrial profile over the period since surveys started is shown in the later figure. A reminder here that figures relate to the year quoted and that the survey itself was carried out in the 1st quarter of the following year.

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\(^1\) Micro company <10 employees, small company <50 employees, medium company < 250 employees, large company >250 employees.

\(^2\) An SME according to Eurostat is a company employing less than 250 persons, having less than €50m turnover (revenues) and the capital not controlled by a large company.
In the chart to the right, are shown the number of companies in each country which were contacted (ie 726) and the number which responded. Our database covers the EU 28 plus Norway, Switzerland and Canada as ESA member countries and Albania, Bosnia-Herzegovina and Serbia as other European countries. The UK, as in previous years, has the largest number of companies with Germany and France second. The largest number of responses came from Germany with the UK second and France and Italy third. The response from UK companies was noticeably lower this time compared to previous surveys; maybe an early sign of Brexit?

The chart is ordered by the percentage of responses coming from each country. The highest percentage came from Lithuania, Luxembourg and Poland with no responses from Albania and down. Whilst an overall response of 28% is quite good, we do feel that it could be higher. It is worth noting that we had to apply considerable more effort than in previous years to elicit the responses amid reports that companies were suffering from an overload of surveys. We shall examine means to improve this in future years.

Companies are distributed throughout Europe with 13 countries having 20 or more companies in the sector.

The number of companies has grown at around 7.3% p.a. in recent years from 310 in 2012 to 510 in 2016. Growth unsurprisingly concerns mostly small and micro-sized enterprises. The chart opposite represents the classification of the companies over the recent years. The years yielding real data are shown more heavily while those which have been projected are shown in a more transparent mode.

Regarding the company ownership, some 80% of the surveyed companies are privately owned (72% in 2014). This confirms the view that the sector is dominated by start-ups with the founder owning the company. Five percent of the companies are wholly or majority-owned by a government, academic or other public sector organisation.
The survey shows a total sector employment of 7877 persons in 2016 for Europe and Canada an increase of 16% since the last survey for 2014. The 137 companies which responded reported that they employ 4100 persons or 52% of the final, calculated total. Projecting that to the full population of 510 companies based on the average number of employees in each class of company gives us the total of 7877.

Since we are extrapolating to arrive at a final figure, to give an idea of the sensitivity of the methodology, a change of 100 to the number of companies in our database leads to a change of 686 employees; or roughly 7 employees on average per company. This value comes as a result of assuming a distribution of companies (according to classification) based upon the actual results over the three surveys. We consider that the methodology is quite sound but it is clearly dependent on the assumptions surrounding the calculation of total companies. Hence, we are quite cautious regarding this, as we are for all assumptions made.

The chart left shows the evolution of total employment over this period with this year’s results alongside those for the 2006 (non-EARSC), 2012 and 2014 surveys. Within ten years, employment in the EO services sector has grown steadily at a rate of around 10% p.a; from 3100 employees in 2006, to the total number of 7877 in 2016. All of the growth over the last 2 years has come from the SME’s whilst large company’s employment numbers have remained essentially flat. This is similar to the outcome of our analysis in 2014.

Canada is a member of ESA and previous surveys have each time given totals for Europe and Canada combined. This year, we present the European figures alone. We have used figures from the Canadian Space Agency survey (Ref: State of the Canadian Space Sector 2014), projected both backward and forward at the average growth rate, and deducted from the total number of employees presented earlier. According to our findings, there are 6920 employees in the European EO services industry in 2016. The historic analysis of the total number of employees in the EO services sector in Europe is shown.

The total number of employees within each class of company is shown below for 2016. As in 2014, the small and medium categories, which employ close to 70% between them, make the strongest contribution to the overall sector employment. The three large companies (1% of the total number of companies) employ 15% of the total workforce. The micro category has increased a little since the last survey.

According to our previous surveys, employees in the EO services companies are highly qualified with nearly 90% of them holding a university degree level and over 60% having a post-graduate degree or higher. The gender balance of the sector seems to stay essentially fixed at 33% female to 67% male (1:2).
The employment and the revenue figures for the sector provide the basic measure of the health and trends of the industry. In 2016, the total revenues for the EO Services sector was €1247m (2014: €910m) and is growing at a rate of around 12.5% p.a. We calculate both the revenue and employment figures using basically the same methodology; to the direct responses coming from the survey, we add an amount calculated for the rest of the companies in the sector for which direct information is not available. We make some cross-checks using commercial company information services to check or to fill in some gaps where critical to the outcome. However, we find that this has very limited value for the large majority of the major companies and is not necessary for the small and micro ones. The actual, reported figure is 67.9% of the calculated total which is very much in line with the previous surveys conducted by EARSC. The result, continuing the trend of previous years, is shown in the chart below.

The actual data points are in 2016, 2014, 2012 and 2006 with others being calculated by extrapolation of the raw data taking into account the revenues by class of company and average revenues per head. A significant part of the increase between 2014 and 2016, is due to the WorldDEM contract won by Airbus in 2015 and which has a value of around €450m over 4 years. We have taken a spread of the revenues over the 4 years which will need to be taken into account in future years.

Again we have also taken advantage of the CSA survey in Canada which shows sales by Canadian companies of €85m in 2014, to derive figures for the European companies alone. Projected forward at 10% per annum, we consider that €102m of the €1247m is coming from Canada, from which we conclude that the European total is €1145m.

The growth rate in the sector is of great interest as European stakeholders look for a "Copernicus effect". We still consider it too early to be very visible, but there is an upturn in the growth rate across all categories of companies as is visible in the chart below. The large companies are still dominating and of course this is influenced by the WorldDEM contract mentioned earlier.

Our approach is to use a rolling 5-year window to calculate the growth rate. The key trend to watch is the growth rate for all companies which is seen to rise from 10% in 2015 to 12% in 2016 and for the micro companies which is rising from 6% in 2015 to over 10% in 2016. These trends will be the main ones to watch in the next survey for the influence of Copernicus.

The overall profitability of the sector remains flat at just over 8% based on the 107 replies which were made to this sensitive question.
Copernicus is “pregnant with potential” according to one of the respondents when asked about their interest to use data and information coming from the programme. This reflects the strong interest which we found and why we dedicated a specific section of the 2017 industry survey to issues concerning Copernicus. We are planning to track this interest, and the business arising as a result, in future surveys. We see already an increase in growth rate which can be considered, at least partly, to be due to Copernicus and especially amongst the small and micro companies.

Companies were asked firstly, whether they are using the data coming from the Copernicus Sentinel satellites and secondly regarding their use of the products coming from the Copernicus Services. Of the 122 companies which gave a response to this question, 89 are using the Sentinel data (33 not using) whilst only 46 are using the Copernicus services (76 not using). Based on the whole survey sample, 60% of companies are using data from Sentinel’s whilst 32% are using information from Copernicus Services. We are doubtful whether these high usage numbers would apply to the whole population of 510 companies but have no evidence to suggest whether this is the case or not.

Use of Copernicus Data and Information

Copernicus data is available on a free and open basis; a policy which is expected to drive innovation and uptake amongst small companies and entrepreneurs. We asked the companies how much of their revenues could be considered as being driven by free data coming from any source? The results indicate that around 10% of the overall sector revenues are driven by free data; how much of this is driven by Copernicus? We asked a separate question with this increased precision giving the results shown on the right. The responses show €92.3m of revenues driven by data and information from Copernicus of which €84.8m of revenues are coming from the programme directly.

Whilst we do not have a specific breakdown, based on our knowledge of the companies which responded, of the total of €84.8m revenue coming from participation in the programme, we would estimate that around 50% of the revenue is coming from data sales (contributing missions) and around 20% from other activities linked to consultancy or software leaving 30% or around €25m coming from Copernicus Services. This compares to the total spent by the EU on Copernicus Services of €122m in 2016. Hence, we conclude that industry is contracted for around 20% of the total value of contracts for the Copernicus Services.

The second question was to find out how much business companies are doing as a result of Copernicus i.e. not as a result of direct revenues from the EU. At first sight, the result suggests that €7.5m (€92.3-€84.8) is coming from the exploitation of data and information. However, the revenues from the programme include various elements linked to infrastructure and consultancy studies – some of which are even at national level.

If each is around 10% of the total, then the value of business coming from using Copernicus data and information is around €24.5m. It is great to see that some benefit is being felt already. It is really early to see this since the Sentinel data was barely available in 2016 and services even less so. We are optimistic that this will grow significantly over the next few years. Of the 35 companies which reported that they were participating in the programme to deliver Copernicus Services, the largest
Then we asked what are the areas of main interest for companies in the Copernicus Services. In the context, this was considered to cover both the participation in the service supply as well as the possibility to exploit the services in other ways. We find that by far the strongest interest lies in the Land Service. Note that companies could answer "yes" to multiple areas and many small companies replied only "land" whilst larger companies also replied "security" and other services.

Companies are rather optimistic concerning the impact of Copernicus on their business. We ask them to rate on a scale of -5 to +5 their views on whether there has been an impact on their business today and whether they consider it will have an impact in the future (next 12 months). There is a clear shift in optimism. Collectively, companies consider that the impact today is positive - an index of 1.5 - but that in the future the impact will be much stronger - an index of 3.3, which is strongly positive. This may be a reflection of the introduction of the DIAS programme. If we look at the factors which companies consider to be the main reason why they are not using Copernicus data and information, then access is by some way the most strongly perceived barrier (see chart below).

We asked companies what they consider to be the most important issue to address in order that they could benefit from Copernicus. We made no distinction between issues for the industry to address or for the Copernicus governance to address. The results certainly support the EC initiative to develop a new Copernicus service giving access to the data and information (DIAS). Around 1/3rd of the companies placed this as the most critical issue whilst second came the view that the data is not well-adapted to their customers needs. Since the Sentinels are designed with public sector needs in mind and which are met through the Copernicus Services we are not surprised that companies are less interested. On the other hand we do perceive a very strong underlying interest in new products and services coming through current R&D investment. We consider that the next few years will see strong developments in this respect.

We have looked at this result categorised by company size but there is no discernible trend and the proportion of micro companies indicating an issue seems to reflect the overall population. Comments received in the "other" category are sometimes quite strong. Whilst the majority say it is not relevant for their business, a number of SME's feel threatened by larger players taking their business. Four responders cited competition and the lack of a defined boundary between the public sector and private sector activities, whilst two responders cited insufficient promotion of the capabilities of Copernicus. Three of the respondents indicated that they intended to be using Copernicus data and information in the future.

Overall, the feeling is very optimistic and we look forward to seeing this translated into future survey results.
Activities

The value-chain for EO services (illustrated on p15), extends from the data downloaded from the satellite through to geospatial information where the EO component may be completely hidden. We are covering companies which are doing business by selling data or information. Companies, in other sectors such as "oil & gas" or "engineering" which process data and information for their own internal use are not included. The latter we refer to as “internal service providers”. EO service companies in Europe are active right across the value chain. Our survey does not include satellite manufacturing but starts with those activities concerned with the supply of data, those selling value-adding services with a direct satellite component, and through to those selling geospatial products. We also include consultancy and software companies dealing with EO data. In future, we may need to include other service providers such as cloud services etc.

Split of activities (based on 2016 revenues)

The chart above on the left shows the relative size of each part of the value chain. Compared to 2014, the part of value adding services has been reduced – 25% against 44% in 2014 – whereas the part of hardware/software increased quite a lot. We attribute this variation to the predominance of projects in the sales mix. In order to give a more robust picture of the activity split we decided to combine the data gathered by the EARSC study team in 2012, 2014 and 2016. Results are displayed in the right chart: the downstream, value adding represents 45% of the activities, the data sales 31% and hardware/software 23%.

Split of activities (combination of 2012, 2014 and 2016 data)

The chart opposite shows the number of companies active in each segment. Out of the 127 companies responding to this question, 8 are satellite operators, 27 are reselling data and 87 are value adding. Many companies are active in more than one segment.

Number of companies in each segment

We also asked companies what kind of services they offered between:

- fully automated geospatial web services (i.e. no human intervention in the end-to-end workflow from subscription to delivery - Off the shelf - "Build once Sell many")
- semi-automatic geospatial services (i.e. limited human intervention - subscription and delivery using web services but production and/or quality control done with human intervention)
- bespoke services (i.e. full human intervention - traditional project approach to create products tailored to the needs specified by one customer)

As we can see in the chart above, the provision of bespoke services, tailored to each customer’s needs, has the biggest share today.
EO is a technology which provides products with a broad range of applicability – generally referred to in the sector as “applications”. Each application may itself be used in several different market segments. Classification of each of these is open to interpretation which is why we developed a taxonomy (EARSC Taxonomy 2014) to bring some common terminology for the domain.

The taxonomy addresses the market from the perspective of the supplier and the client. So a company may be producing metocean products (which we refer to as “thematic”) for different customer “market segments” such as shipping, oil & gas (offshore), construction etc. In our survey, we ask companies to indicate what percentage of their revenues is coming from each of these thematic sectors and market segments. We acknowledge that it is difficult for companies to provide this information.

In the first case, the thematic breakdown of revenues – below – shows topography as the largest contribution. Clearly the WorldDEM contract is making an impact. After this, we see several different land use related and security topics appearing.

In the EARSC taxonomy we group the individual segments into 6 major sectors. The proportion of revenues in these 6 sectors is shown in the chart left and below. “Land” and the “Built Environment” (urban and infrastructure) make up over 50% of the sales mix with marine applications making a further 20%. The rest is divided between security, natural disasters and climate.

Compared to the last survey, the percentage of land products has fallen as has that for “ocean and marine”. The share dedicated to the built environment has been steadily increasing which could be due to both a wide

focus on smart cities but also due to more, and higher resolution data becoming available, which is more suited to urban applications. The percentage of atmosphere and especially climate related products has increased which could be due to more sensor / in-situ data becoming available and /or also the interest stemming from the Copernicus Services.
Earth Observation is a global business and European companies are well-represented in the global market. In 2016, 55% of the revenues came from Europe of which thirty percent is coming from sales made in the companies’ home country. The share of exports has grown by around 2% over the two year period, which is not statistically significant.

After Europe, Asia is the next largest market followed by North America and the Middle East. The overall geographical distribution is very similar to that from 2 years ago. Russia/CIS, Oceania and Africa are all showing steady rising trends but all from low bases.

The breakdown of the market by segment is the hardest of the data to be provided. With the large number of segments even with 120 companies providing answers to this question, the sensitivity of the results is high. The breakdown is made according to the EARSC taxonomy which is currently being reviewed. The basis for including this information in future surveys will be reviewed also.

Despite the high sensitivity, the information is useful and not available elsewhere and so we kept it in for this survey which shows environment and climate as the top segment with security and defence second and agriculture third.

The chart opposite shows the market sales for the 6 major sectors defined in the taxonomy. Sectors dominated by the public sector i.e. public authorities and international organisations account for 55% of the total. The public sector will also be a customer in sectors linked to the natural resources.
The split by market sector is consistent with the results found for the customer type which shows public sector customers providing over 60% of the revenues when R&D is included. This is essentially unchanged from previous surveys. The revenues from other commercial sectors i.e. private companies whilst rising in absolute terms has fallen slightly as a percentage share of the sales; as can be seen more clearly in the chart below.

To overcome the “project” effect, the results over 3 years are combined and compared with those from this year (chart below). Some small changes are visible but no major trend. Whilst we hope that the commercial market size will increase as more and regular products become available (especially on-line services), we consider that the uptake in the public sector should be just as strong.

Hence we expect this ratio to stay quite stable but of course anticipate that the whole “pie” will increase in size.

The level of external R&D funding coming from public sources is seen to have fallen from around 12% on average to be 9% currently. It is unclear why this should be the case but should be addressed with the EC stakeholders running the H2020 programme.
Given the large number and scale of changes going on in the sector, what can we expect in the future? The business is maintaining the growth rate of around 10% per annum which has been seen over the last decade; but with an increase to around 12% recently. Driven by increasing volumes and variety of satellite imagery, the on-going IT revolution with cheaper storage and more processing power as well as strong national interests in an uncertain world, the EO sector seems set for more growth over the next few years.

Companies are optimistic for the future as shown by the trends. Both for future revenues and for employment, responses are showing a factor greater than 2. The employment index stands at 2.02 and the revenue index at 2.48. That for revenue has fact that revenue increase is always been greater than that for employment due, we consider, to the progressive whilst employment necessarily jumps in discrete integers. Where companies are small it is a heavier commitment to increase the task force than to see a revenue increase which may not necessitate increased staff.

It is the small companies (10-50) employees which are the most optimistic. They have been through the early growing pains and are ready for the next steps but have not yet reached the point where further growth seems difficult. Having said this, there is not a major difference across all classes with the large companies cautiously optimistic! Nearly 65% of companies expect to increase their staff level in the next year whilst just over 75% expect their revenues to increase. Only 5% expect to see reduced employment and/or revenues.

One main trend which we have identified is that towards on-line services. With cloud storage and processing, new business models are emerging offering clients true services rather than bespoke products; one product to many customers rather than one product to one client. We have surveyed companies to gather their views on this trend with the result as shown.

There is a strong majority of companies which consider that on-line services will make up over 25% of the market in 5 years time increasing from less than 10% today. If calculated against the revenues, it represents a 30% per annum growth in this particular market (i.e. for on-line services). We can see businesses positioning for this trend by the large number of platforms which are emerging as discussed earlier in the strategic context. It is also the reasoning behind the EARSC initiative to develop a Marketplace for EO Services known as eoMALL.
EO Services Value Chain

Glossary

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<td>Satellite Operator</td>
<td>An owner/operator of a satellite system selling data acquired from the system.</td>
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<td>Ground Station Operator</td>
<td>An owner/operator of a ground station acquiring data from a 3rd party owned satellite system.</td>
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<tr>
<td>Data Reseller</td>
<td>A seller of data coming from another satellite operator.</td>
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<td>Value-adding</td>
<td>This covers the activity of processing satellite data probably combined with other data to generate EO products or application products sometimes referred to also as thematic products.</td>
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<td>GI Services</td>
<td>This covers provision of products that use EO products as part of their input. A downstream service provider is working indirectly with EO satellite data.</td>
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<td>Consultancy</td>
<td>The provision of one-off products based on specific knowledge. It is distinguished from other services by the one-off nature of tasks where other services are providing regular and multiple products</td>
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<td>Internal Service Department</td>
<td>An organisation providing EO or geospatial products to other departments within a company but which is not selling them in a commercial market. The parent organisation will be in a user sector such as oil &amp; gas, agriculture etc.</td>
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<td>End User</td>
<td>A customer in the public or private sectors which is procuring any geo-information product.</td>
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<td>Integrated End User</td>
<td>Simply defined as being an end-user with its own internal EO service capacity.</td>
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<td>Geo-information product</td>
<td>Any or all products covered by the terms: satellite data, value added, or geospatial products</td>
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<tr>
<td>On-line Service</td>
<td>Service generated automatically and delivered on-line. It can be characterised by one product for many customers.</td>
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EARSC, the European Association of Remote Sensing Companies is a membership-based non profit organisation which coordinates and promotes activities of European companies engaged in delivering Earth Observation geo-information services. EARSC’s key goal is to promote the industry and to help to develop the market for EO services. EARSC is representing EO providers of geo-information services in its broadest sense creating a network between industry, decision makers and users and covering the full EO value chain from data acquisition through processing, fusion, analysis to final geo-information products and services. EARSC currently has around 100 members and the network contains all the leading European suppliers of EO data and value-added products as well as many small and micro-enterprises.