

ESA Portal Brings Europe's Mars Adventure to Millions

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Currently read by more than 1.5 million external visitors a month, the ESA Portal is now the leading source of European space news and information. Mars Express, Europe's first mission to Mars, brought unprecedented traffic to the ESA Portal, presenting the team that run it with the challenge of dealing with a fourfold increase in visitors. A new system put in place in time for the great Mars adventure guarantees fast round-the-clock access to the Portal from around the World.

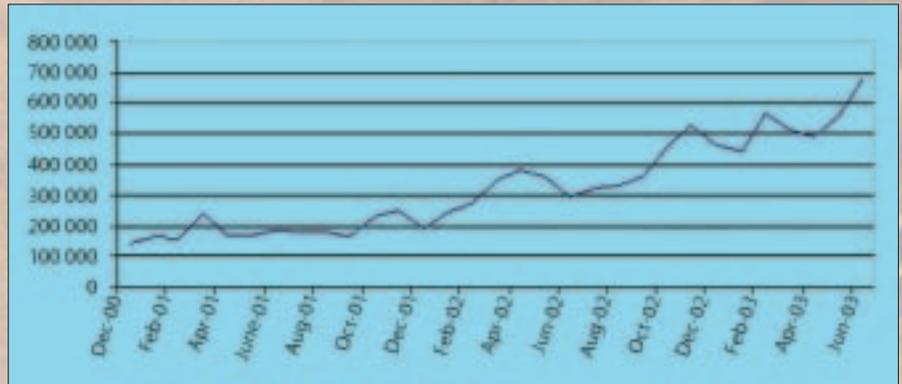
About the Portal

An independent marketing study carried out in 1999 showed that the public image of ESA was weak and fragmented. At that time NASA was better known among the European public than ESA. The Internet was a logical choice as one of the key elements to boost ESA's visibility and strengthen the Agency's image. Although ESA had already had a web presence since November 1993, a new project was started to create a European online space magazine. The new ESA Communication Portal, www.esa.int, was launched on 18 October 2000. In line with the recommendations of the study, its main objective is to increase awareness of the importance of space for Europe and its citizens among the general public and the media.

With a coherent graphical 'look and feel', the Portal conveys a consistent image of ESA. The site is a dynamic online magazine, with a news desk model, publishing at



The ESA Communication Portal



ESA Portal access statistics, December 2000 to June 2003 – External visitors

least one new article every day, with more and more emphasis on multimedia elements such as graphics, video clips and animations. The backbone of the ESA Portal is its ContentServer publishing system, allowing editors to concentrate on news,

content, and images, while guaranteeing a consistent graphical house style.

In the three years since its launch, the number of visitors to the Portal has grown steadily. From 140 000 visitors in December 2000, by the end of 2001 the Portal

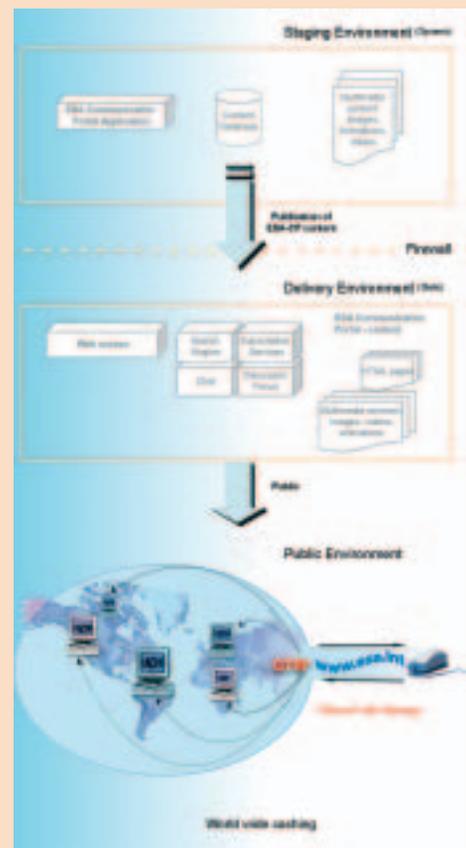
What is Caching?

'Caching' basically means that a copy of the ESA Portal's content is stored on thousands of other servers worldwide. These servers are close to the 'edge of the Internet', i.e. very well connected to the backbone network infrastructure. A user requesting to see an ESA web page thereby no longer downloads this from the Portal's server at ESRIN in Frascati (I), but from the closest and best available server. This is made possible with the support of a commercially available Content Delivery Network and sophisticated worldwide Internet traffic monitoring and management applications. As soon as any change is made on any page of the Portal, it is almost instantly replicated on the network of servers.

This 'whole-site-delivery' technology relieves the load on the Agency infrastructure, helps to bypass common Internet bottlenecks, and at the same time boosts the performance of the Portal experienced by the visitor in terms of availability and responsiveness.

As well as supporting peaks in traffic due to special events, this service solution offers a number of distinct advantages for the Agency's website year round:

- guaranteed worldwide fast delivery of the web pages even during peaks in traffic, 24 hours a day, seven days a week
- reduced infrastructure costs, since there is no need to upgrade servers, hardware or the network
- increased resilience against security threats
- real-time on-demand reporting on network utilisation, total bandwidth, and server response times
- 24/7 availability of technical support staff at a network operations centre.



The network infrastructure



VideoTalk, an exciting new multimedia feature that discusses the questions that we hope will be answered by ESA's pioneering space exploration

Monitoring the statistics, it was obvious that contingency plans to handle such peaks in traffic were needed. On the day of the launch of Mars Express, the interest from the general public was so enormous that the infrastructure hosting and serving the web pages became overloaded and users began to report problems downloading material from the Mars pages. The available Internet bandwidth was simply not sufficient to deal with this massive interest.

It was clear that with the arrival of Mars Express at the Red Planet, together with the landings of the NASA rovers, worldwide interest in Mars was going to reach unprecedented levels. An immediate solution was necessary. A straightforward increase in network bandwidth had to be discarded for technical and cost reasons, because the real need was neither precisely known nor possible to estimate. Was it 10 Mbit/s, 100 Mbit/s, or even more? By working closely together, the Agency's Online Communication Section and Information Systems Department identified 'caching' of the content of the Portal worldwide as the best solution (see accompanying panel). After evaluation of the vendors available, one of the market leaders was selected to provide this service under contract to ESA.

Arriving at Mars!

An additional challenge for the Portal team was that while there would not be hard news every single day, this huge new audience had to be kept 'online'. To this end, special Mars Express pages were created in close cooperation with the ESA Science Communication Service. The goal was to have one 'new(s) item' every day, from 1 December until the arrival at Mars on 25 December. These included images, graphics, animations, video clips, background information, news and press releases, interviews with lead scientists, a web-cam image from the Control Room in ESOC refreshed once per minute and, for

was already attracting about 250 000 visitors per month. This figure doubled again in 2002, reaching 600 000 visitor sessions a month by summer 2003.

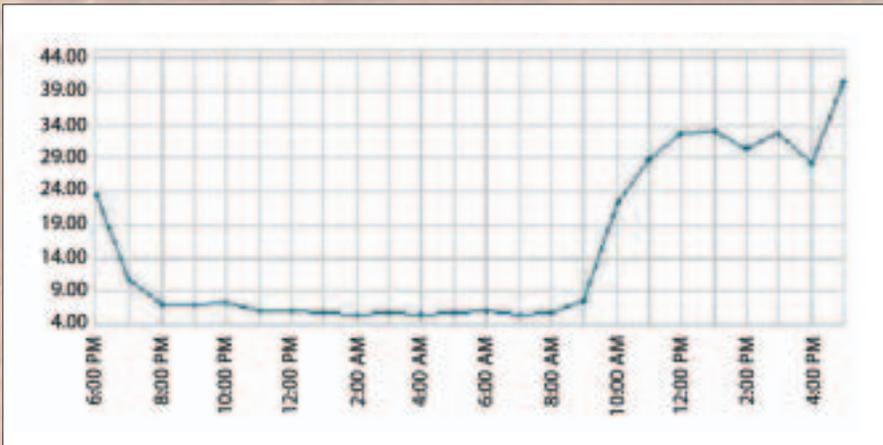
An active news promotion policy, as well as partnerships with other media or web players, has played an important role in the steady increase. Visitors are attracted by the reliable flow of news and accurate background information, presented in an easily understandable and coherent way.

The Launch of Mars Express

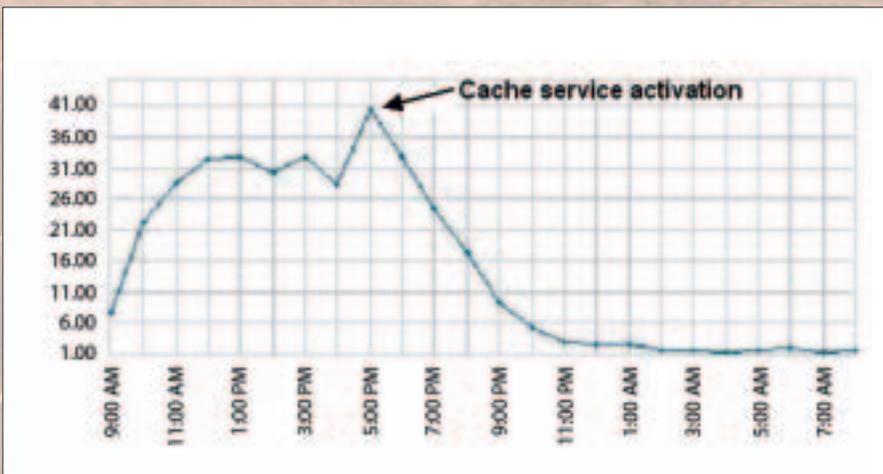
One of the biggest challenges that the ESA Portal team faces are the 'special events' – launches of spacecraft or astronauts or other high-profile events resulting in peak traffic on the site. With the web being increasingly perceived as the ideal medium for communicating 'space' to the public, the launch of Mars Express in June 2003 boosted the visitor sessions to a then-record of 70 000 visitors on a single day.



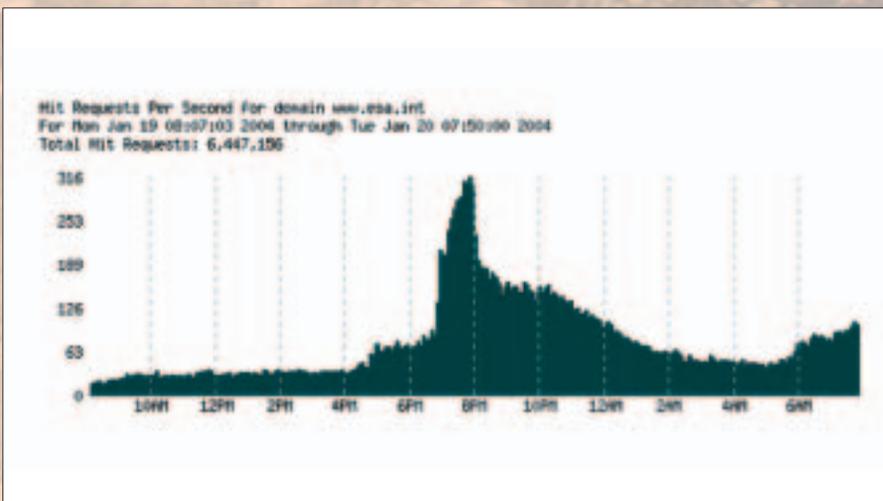
The web-cam image from ESOC was downloaded more than 1.6 million times in December 2003



Average time in seconds taken to download the ESA Communication Portal Home Page between 6 pm on 3 December and 5 pm on 4 December 2003, prior to activation of the caching service



Average time in seconds taken to download the ESA Communication Portal Home Page between 9 am on 4 December and 8 am on 5 December 2003. Note the drop in download time after 5 pm when the caching service was activated



The traffic surge after the publication of the first Mars Express images

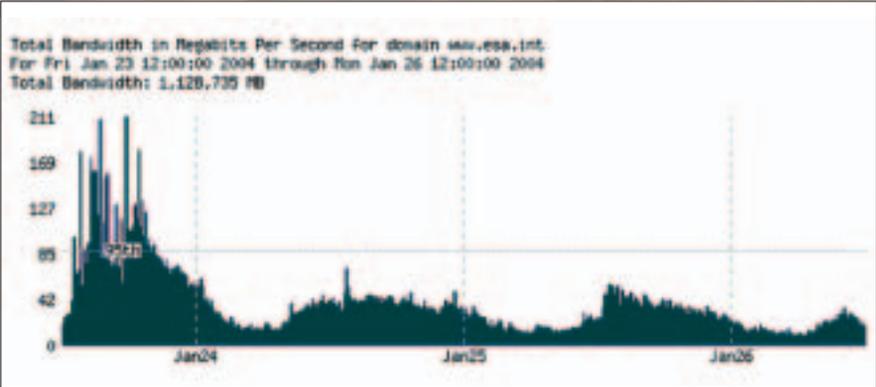
the first time, an exciting new multimedia feature called ‘VideoTalk’. For the countdown to Christmas, these elements were presented in the form of an advent calendar – something new each day behind every window.

The first peak in traffic was expected on 19 December, with the separation of the British Beagle 2 lander from the mother spacecraft Mars Express, and so the intention was to activate the new caching service before that date. However, the first blurry image of Mars taken by Mars Express while still 5 million kilometres from its target, published late on 3 December, brought such a big surge in traffic that activation of the caching service had to be brought forward by a week.

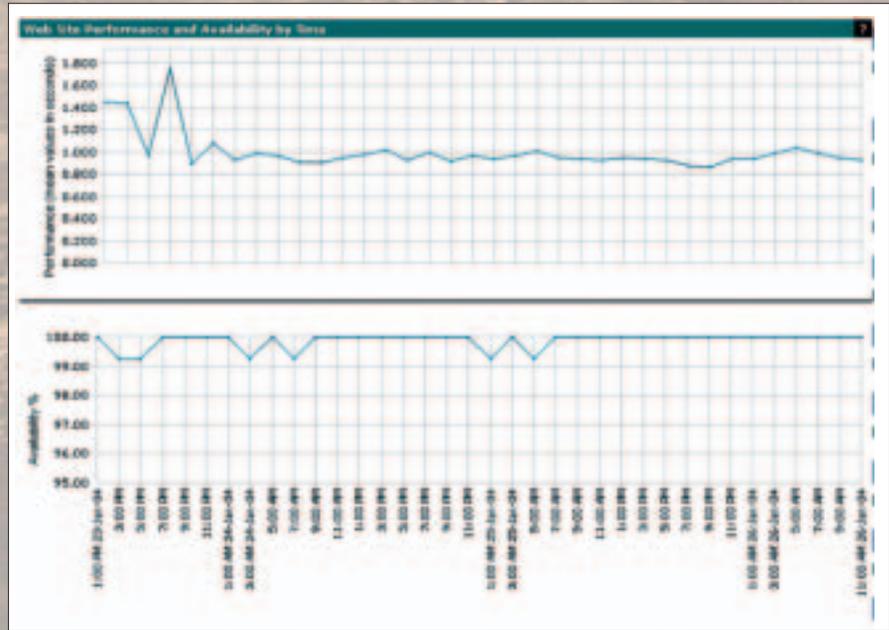
To verify the efficiency of the new caching service an independent monitoring system was set up. The results were startling – while on 4 December from early morning on, the average time required to download the ESA Portal’s home page increased steadily from some 20 seconds to more than 40 seconds (against a benchmark value of not more than 8 seconds), in the late afternoon, once the cache servers had taken over at 5 pm, the download time dropped to a ‘dream value’ of very close to 1 second. At the same time, the website’s availability (measured for 35 cities worldwide) increased from a low of 45% in, for example, Shanghai, Hong Kong, San Diego and Kansas City, to 100% everywhere.

Coverage of the separation of Beagle from Mars Express on 19 December, including a live webcast from the ESOC Control Room, attracted another record number for a single day with some 118 000 external visitors. This record was soon to be broken again by the arrival of Mars Express at Mars on Christmas morning 2003, with the added drama of waiting for news about the Beagle lander. In all, 280 000 external visitors participated in live web events and streaming – four times the number that had looked at the site on launch day! Traffic remained very high during the period up to New Year’s Eve.

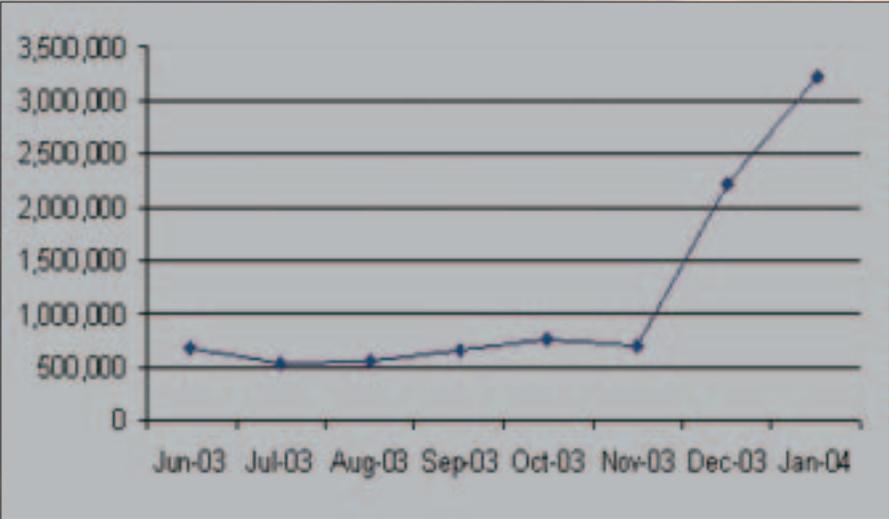
In total, the ESA Communication Portal had served almost 3.4 million visitors during the month of December – almost



Network bandwidth utilisation after the discovery of water on Mars



Average worldwide site performance and availability during the weekend of 23/26 January 2004



ESA Portal access statistics, June 2003 to January 2004 – External visitors

ten times more than during the same period the year before.

Let the Flash Crowds In!

In ‘Flash Crowd’, a science fiction story of the 1970s, the author describes the consequences of instantaneous (and free) teleportation, which allowed tens of thousands of people worldwide to flock almost instantaneously to the scene of anything interesting that was happening. In web terms, a similar phenomenon occurs when a site catches the attention of many ‘surfers’ and attracts sudden surges of traffic, often leading to an overload of the site’s Internet bandwidth or servers.

Several such ‘flash crowds’ hit the Agency’s Communication Portal at the end of January 2004. The first came with the publication of the first image of Mars taken by Mars Express on 19 January – an all-time high of 310 000 visitor sessions on a single day, on 20 January.

The discovery of water on Mars, officially announced during a Press Conference at ESOC on 23 January, also attracted some 240 000 visitors, with peak traffic continuing all weekend. This event was particularly ‘bandwidth heavy’, due to the availability of multimedia material, which led to traffic peaks exceeding 200 Mbit/s immediately following the announcement, almost a hundred times the consumption only a few weeks earlier. Although more than 1.1 Terabytes of data were provided to users during this ‘hot’ weekend, no service interruptions or decreases in performance were reported.

‘Brilliant!’

Today the ESA Communication Portal, as an online magazine for the general public and media, has become the leading source of European space information. In the past years, both the number and the variety of sites picking up ESA’s news have steadily increased. While in the early years only specialist sites such as Space.com referred to the ESA Portal, today the BBC, CNN, Yahoo, Reuters, USA Today, National Geographic, and the Discovery Channel regularly pick up stories from the ESA Portal.



CNN, Heute Journal, Le Monde and La Repubblica are regular customers of the ESA Portal

The Sunday Times (UK) on 4 January 2004 "reached out to the brilliant Mars Express website", calling it "enthalling..., rich in contributions from many sources, ... and an object lesson in how scientists can harness the web to involve the general public, while also reaching those whose interest is more serious."

Even after the Mars storm died down, traffic to the ESA Portal has consistently remained above 1.5 million external visitors a month, with smooth delivery of web pages continuing to be guaranteed by the new caching system. Next Christmas promises to be no less exciting, with the arrival at Saturn of Cassini/Huygens, and the release of ESA's Huygens probe to parachute down to explore the surface of the planet's mysterious moon Titan.



Useful Internet links:

ESA Communication Portal
Mars Express pages
Cassini-Huygens pages

<http://www.esa.int>
<http://www.esa.int/marsexpress>
<http://saturn.esa.int>