



## GMES Service Element



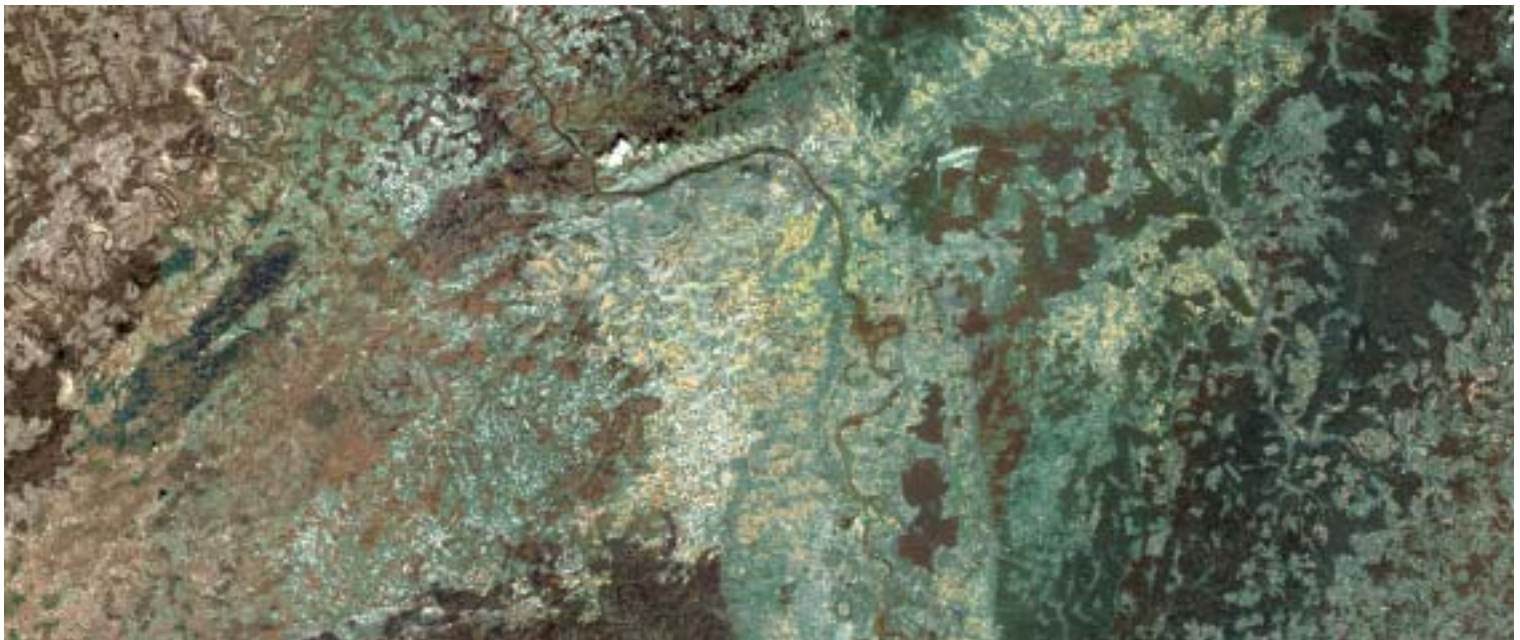
This brochure provides an entry point into the **GMES Service Element (GSE)** Forest Monitoring Portfolio and acts as a hub for information of value to potential users and beneficiaries of the services available. The contents are aimed at managers and policy or decision makers with interests in the forestry sector operating within the following arenas:

- International and Inter-Governmental Organisations including Development Agencies
- National or Regional Governments
- Local Governments
- Non-Governmental Organisations
- Private Companies
- Research and Policy Institutions

GSE Forest Monitoring is a unique element of the **Global Monitoring for Environment and Security (GMES)** Joint Initiative. This is co-sponsored by the European Space Agency (ESA) and the European Commission (EC) with the goal of developing a global monitoring capability for policy makers and other end-users. The GSE Forest Monitoring component consolidates services under the priority theme "Land Cover Change in Europe" within the GMES Master Plan.

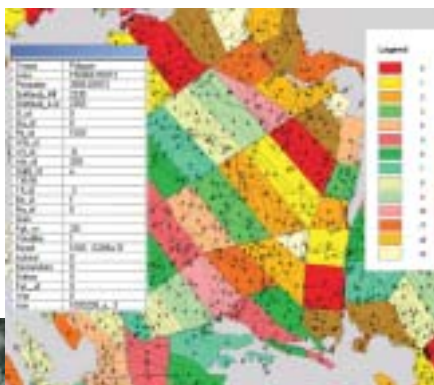
GSE Forest Monitoring supplies accurate, timely and readily available information on the state of forest systems in order to support more informed decisions and improved policies that enable sustainable forest management and related activities.

Large area satellite imagery



## THE CHALLENGE

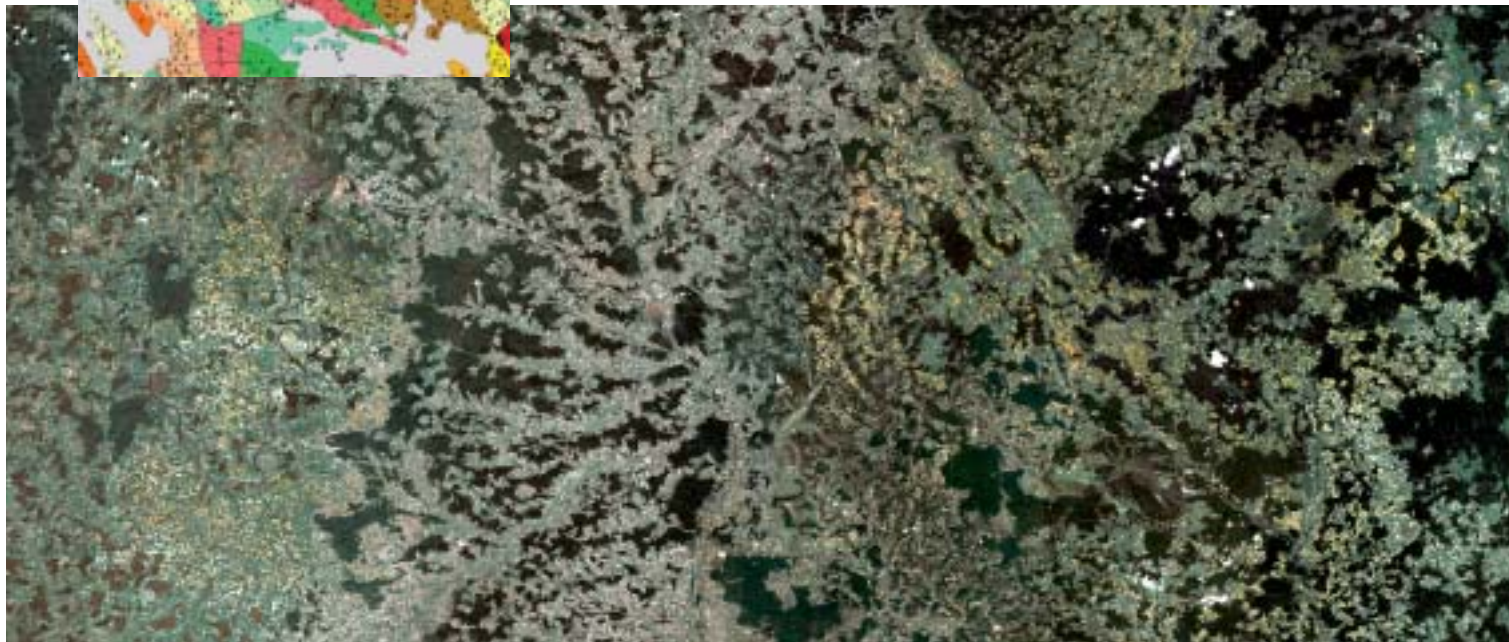
GSE Forest Monitoring delivers relevant information to users



The social, economic and environmental implications of sustainable forest management are highly complex and interrelated. Over recent decades, the operational management and planning of forest resources has been supplemented with the need to comply with international environmental agreements and policy processes. For example, the United Nations Framework Convention on Climate Change and the Kyoto Protocol have far reaching legal and financial implications. At all levels, decision makers now confront the practical and often difficult implementation of related directives and legislation.

In order to achieve these multi-disciplinary goals, timely, accurate, affordable and readily available information is essential. Furthermore, it must be delivered in a form and manner that is accessible and transparent, thus promoting good governance within the forestry sector where sustainability is a paramount objective.

GSE Forest Monitoring delivers on demand a range of standardised information products and services, which address these requirements and have been developed in accordance with the expressed needs of existing users. The services combine the best practices and international reputation of the European forestry sector with a wealth of global experience in the relevant technologies and methodologies. These capabilities have been tested and packaged and are now available to a large and diverse user community.



GSE Forest Monitoring utilises advanced capabilities in the Earth Observation (EO) field focused around the application of various types of satellite imagery to meet end-user requirements. Significantly, the services offered are not data or technology driven but solidly user oriented.

In response to the stated preferences of users mainly in Europe, the services are fully integrated combining applied earth observation (imagery) with ground inventory and modelling techniques. In addition, there is an underlying emphasis on the policy implications of the entire process. Typically, the services deliver digital and analogue information, derived statistics, modelled data and reports as well as training and an awareness of the key policy aspects.

While other approaches may combine some of these elements, GSE Forest Monitoring integrates them all within a comprehensive methodology that delivers tangible and practical outputs to a diversity of users and beneficiaries.

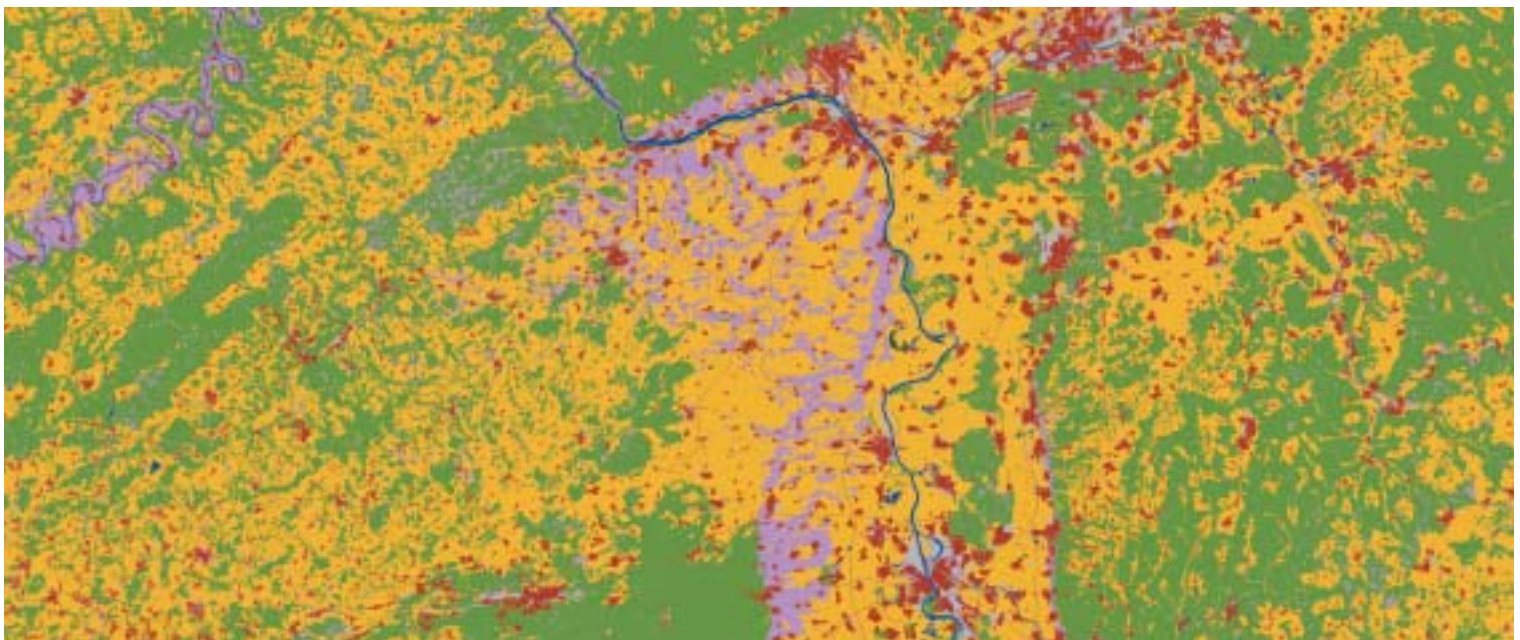
GSE Forest Monitoring supports policy and management requirements within the following major areas:

- **Climate Change**
- **Bio-Diversity**
- **Sustainable Management**

The standardised services and user-oriented outputs are designed to support the implementation of policies within these key areas. Furthermore, the service philosophy stimulates networking amongst users as well as the creation of linkages between interrelated and complementary policies.

For example, the Kyoto Protocol advocates an urgent, long-term and ambitious global vision and increasingly promotes its objectives within the Convention on Biological Diversity and other policies that impact the forest sector. GSE Forest Monitoring contributes practical inputs that support policy development in accordance with sound practices. This is achieved by delivering information (data) collection, integration, analysis, interpretation and distribution to a broad user community. Consequently, essential policies are information-enabled and developed or reengineered to achieve measurable results.

Land use and forestry related information derived from remote sensing data



## GSE FOREST MONITORING-AVAILABLE SERVICES

This in turn may impact the functions of various agencies with interests in the forestry sector and promote an institutional configuration capable of addressing a global vision for sustainable forest management.

In addition, GSE Forest Monitoring also supports local requirements where cross-cutting issues emerge from both policy and practical management concerns. This is especially important in many developing countries where forest resources are highly significant but the technical capacity and policies for their effective management remain weak.

GSE Forest Monitoring is designed to address specific information needs. These requirements are derived from comprehensive policy reviews of relevant conventions and protocols, and user-needs assessments at various levels. The services now available target both end-user needs and the reporting obligations imposed by international conventions and agreements including:

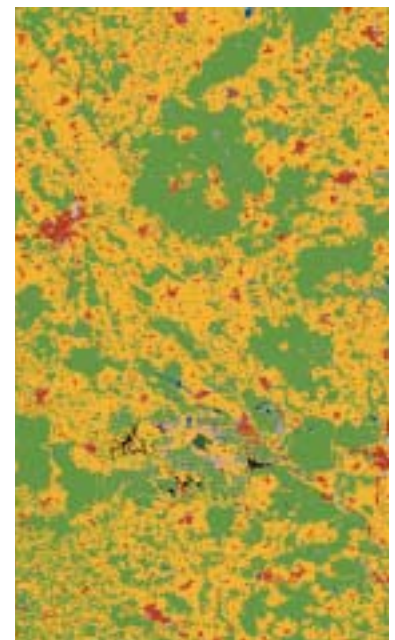
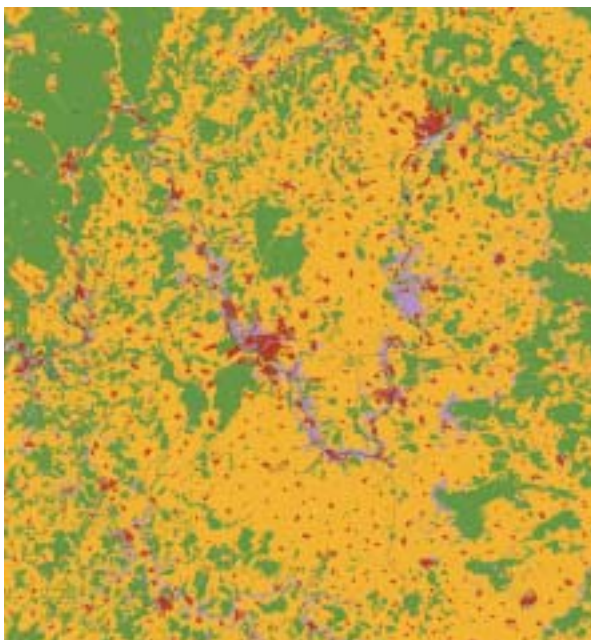
- **The Framework Convention on Climate Change and the Kyoto Protocol**
- **The Convention on Biological Diversity**
- **The United Nations Forum on Forests**
- **The Ministerial Convention on the Protection of Forests in Europe**
- **The European Union Forest Focus Regulations**

In addition, the services supply practical information to meet forest management requirements such as forest certification, and concurrently support the information needs of National and Sub-National Forest Programmes.

GSE Forest Monitoring offers a variety of outputs including digital and analogue information, statistics, modelled data and integrated reports that highlight:

- **Areas of forests, other land use and changes**
- **Areas of Afforestation, Reforestation and Deforestation**
- **Forest structure and changes**
- **Above ground biomass/carbon stock and changes therein**
- **Forest environmental indicators**

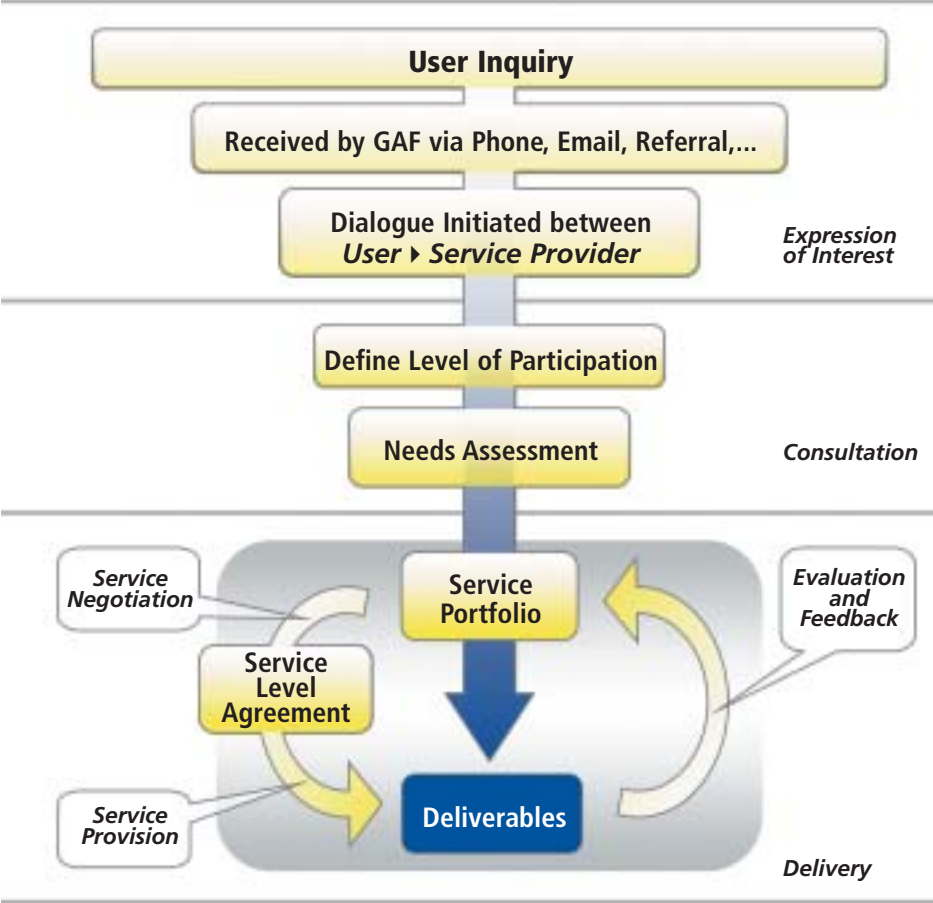
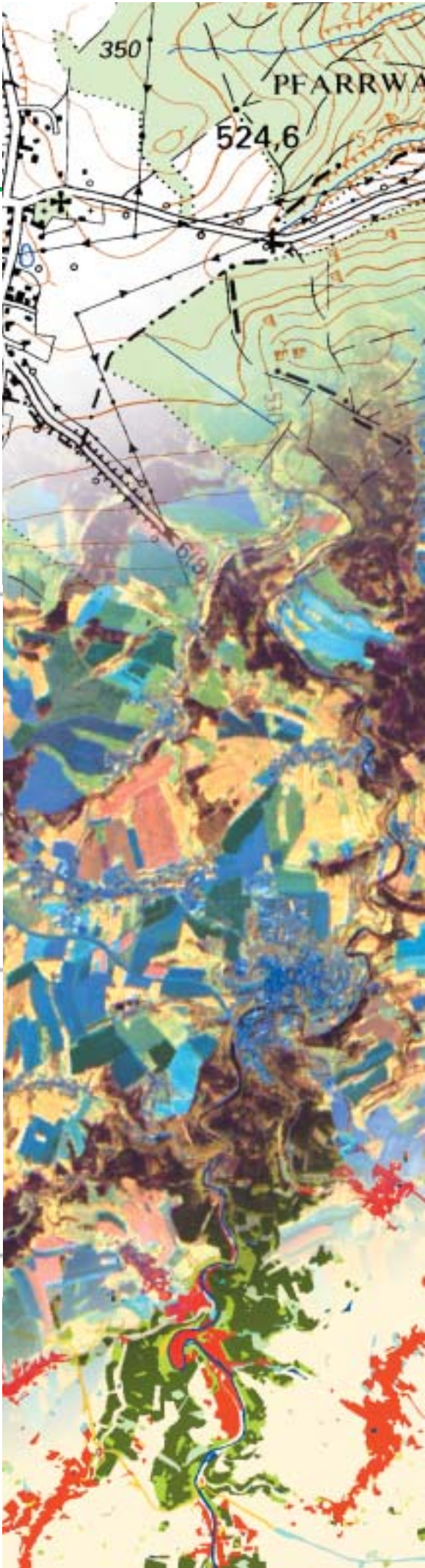
The information components are delivered as various products and derivatives grouped into logical families, for example: Ortho-images, Forest Maps, In-situ Inventories etc. These products can be customised into integrated Service Packages meeting specific user requirements in the most efficient and cost-effective manner.



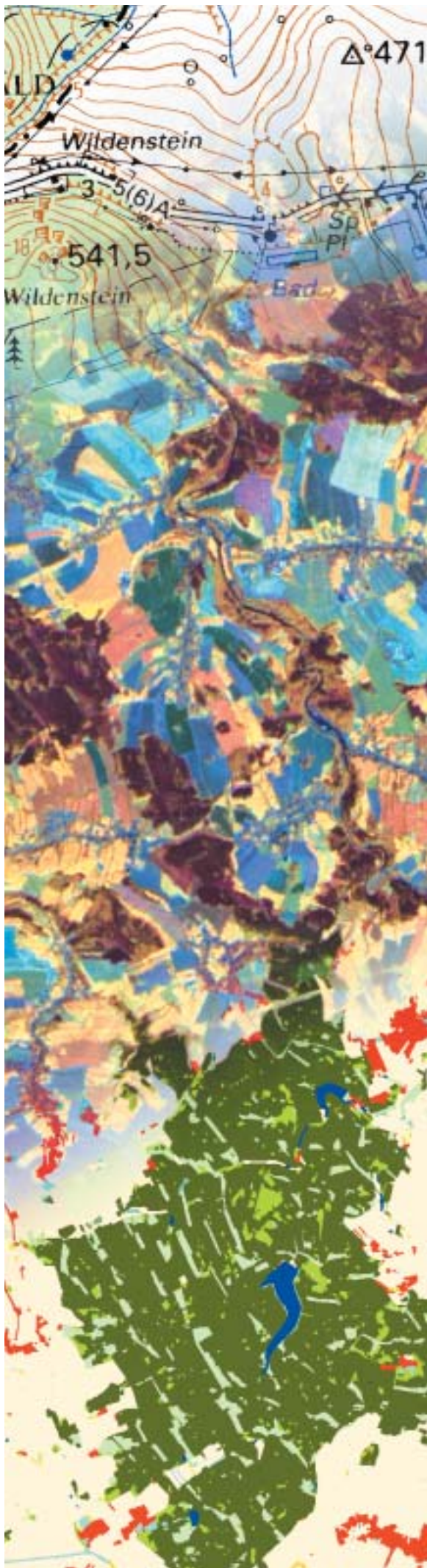
# ACCESSING THE GSE FOREST MONITORING PORTFOLIO

Potential users of GSE Forest Monitoring may access the services through the procedure outlined below. The diagram illustrates the process by which potential users initiate contact with the service provider(s) and are assessed so they benefit from the optimum services available and in accordance with their specific needs.

The entry process is streamlined and also establishes a close working relationship between the service providers and clients (users), which de facto join a global user network focused on priority concerns in the forestry sector.



Roadmap for users to access the service portfolio



## BENEFITS OF GSE FOREST MONITORING

GSE Forest Monitoring offers users the following benefits:

- Cost-efficient access to key information for a variety of policy and decision makers within the forestry and related sectors, including an optimum combination of field and earth-observation data.
- The outputs (service packages) facilitate the formulation and evaluation of a number of policy options.
- The outputs stimulate an informed dialogue between parties with respect to priority issues and support planning and monitoring activities.
- It assists decision makers in the area of legal compliance with respect to binding conventions and protocols by using defined measures and indicators.
- Reporting commitments on the forestry sector are more readily fulfilled at various levels.
- The services effectively translate user needs into standards for products that can be applied widely across forestry-related organizations and geographic locations.
- The overall approach is flexible and amenable to enhancements in line with technological advances, increased data availability, user feedback and growth in demands.

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Multi source forestry information  
designed according to user requirements



## PROMOTING PARTNERSHIPS

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At present, GSE Forest Monitoring consists of the following partners:

- Users; initially drawn from a core group of countries but destined to expand over time
- Operational Service Providers
- System Developers
- Research Partners

The Users presently participating represent key user segments covering specific geographic zones that benefit from the services.

Operational Service Providers represent organisations in the environmental and forestry information management sectors. They have extensive technical and field experience in the delivery of EO-based applications and work closely with users to implement services in target countries.

The System Developers have proven technical capabilities and experience in the definition, design and implementation of information management infrastructures including hardware, software, communication networks, databases and the training of users with a particular focus on Earth Observation technologies and systems.

The Research Partners include organisations at the forefront of developing processes and applications with a special focus on the forestry sector.

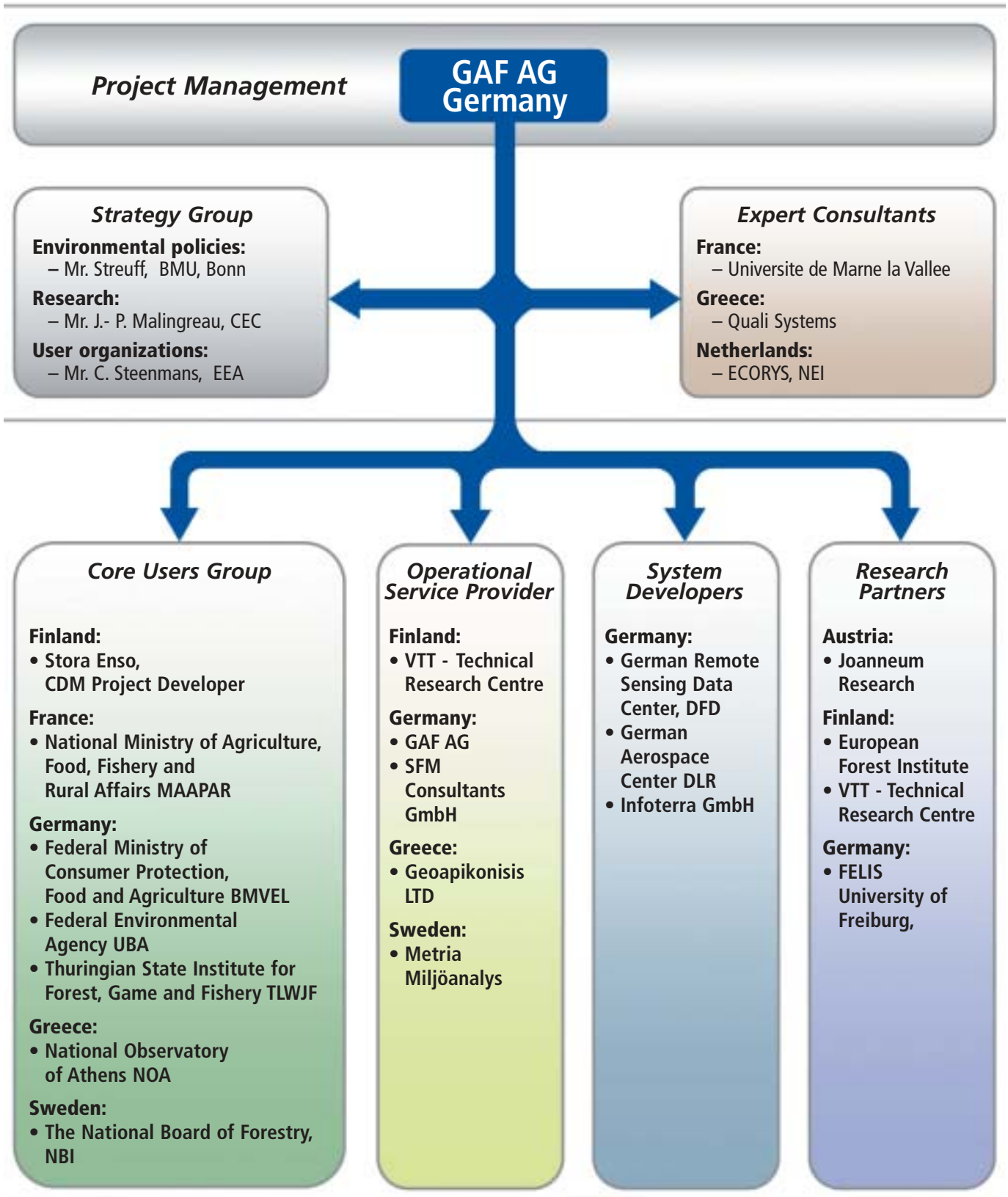
Finally, a Strategy Group examines the tasks and outputs of all partners to ensure consistency in strategic planning and policy objectives.

Overall management of the consortium is undertaken by GAF AG, Germany.

The present stakeholders in GSE Forest Monitoring are committed to expanding its services in support of regular forest monitoring and reporting consistent with the requirements of, for example the Convention on Climate Change and Kyoto Protocol. However, this commitment extends much further.

The existing partnership is open to the inclusion of additional interested parties as users or service providers within an **Open Service Partnership**. It is anticipated the core users of today will multiply incrementally into a worldwide network that will be mutually supportive.

This involves a regularised and controlled process that integrates new users and expands the geographic service-delivery areas while maintaining the quality of outputs. In practice, service providers with local expertise can efficiently deliver customised services backed by global experience and advanced technical capacity.



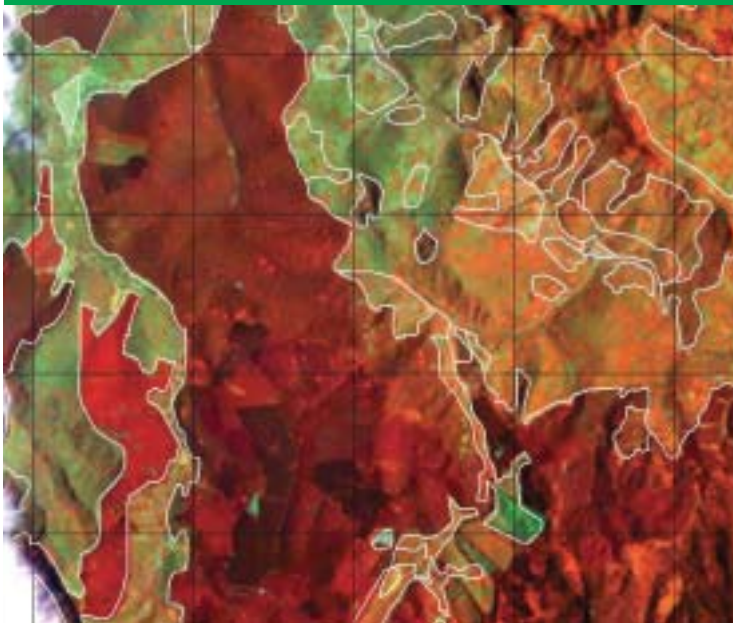
## COOPERATING WITH USERS

During the initial (consolidation) phase of the GSE Forest Monitoring programme, a focused group of core users were selected as clients for standardised service packages.

The utility of the applied services was monitored and evaluated in order to identify areas of maximum benefit, effectiveness and possible improvements. Feedback from the users has been integrated into the service portfolio in preparation for a widening and diversification of the user base. In addition, the information needs of the global user community have been thoroughly inventoried and classified into user segments by regions and countries.

As the GSE Forest Monitoring user network expands over time both spatially and numerically to integrate, for example, private sector stakeholders, major international organisations and policy contacts in developed and developing countries, the derived benefits will multiply through the shared experiences and knowledge of a truly networked user community.

Consequently, the standardised products and services that comprise GSE Forest Monitoring will contribute towards the macro-scale objectives of the GMES Joint Initiative in the strategically vital areas of global monitoring for environment and security.



Top and Middle:  
Forest cover change detection

Bottom:  
Outputs of GSE Forest Monitoring are readily applied in the field.

## IMPACTS ON THE DECISION AND POLICY PROCESS

The availability of quality and policy-relevant information to a global user network should promote improvements in related decision-making and policy formulation. However, within the broad forestry sector the relationship between information and policy is neither linear nor straightforward.

GSE Forest Monitoring is sensitive to the complexities and demands faced by decision and policy makers in the forestry sector, where social, economic, environmental, legal, political and cultural considerations converge and often conflict. Consequently, the products are structured to inform and support professionals acting as decision makers rather than overtly influence or prejudice the decisions.

In summary, GSE Forest Monitoring aims to significantly empower and enable the decision and policy-making processes through the delivery of credible and comprehensible information.

## FUTURE INNOVATIONS AND OPPORTUNITIES

GSE Forest Monitoring is heavily dependent upon the availability and quality of space-based systems for data (imagery) collection. Recent trends in the sector have been characterised by continual improvements in the choice, resolution and quality of sensors and speed of provision of information to end-users. This trend is likely to continue, accompanied by a gradual reduction in the cost of image-information and thereby positively impacting the products and services offered by GSE Forest Monitoring. Similar trends are affecting the hardware and software technologies required to process and analyse the information.

Within the geo-political arena, there are a number of initiatives underway, in Europe for example, which are gradually building a variety of spatial databases of relevance to GSE Forest Monitoring. As these data resources near completion and become available, they will complement and enhance the services available.

Furthermore, EU expansion will place specific management demands on accession countries and their significant forest resources creating new clients and opportunities for GSE Forest Monitoring.

Forest management objectives have changed dramatically over recent years. In addition to the economic value of the resource, their importance with respect to biodiversity conservation, recreation, tourism, rural development and water supplies has also been acknowledged. With the growing recognition of forests as important carbon sequestration and storage capacities, their effective management will not only impact efforts to mitigate global climate change, but also provide new opportunities for communities to preserve and sustainably utilise forest resources.

However, this will demand a greater level of understanding and more informed policies as a means of promoting sustainable activities with positive social, economic and environmental impacts. GSE Forest Monitoring contributes greatly to these crucial and urgent goals. Significantly, close cooperation with users and a focus on their specific needs ensures the delivery of the most appropriate (information) solutions.



Prime Contractor



Service Strategy Group



Core User Group



Operational Service Providers



System Developers



Research Partners



Expert Consultants



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