Virtual Reality
for the
Parkinsonians' Rehabilitation

Fivos ANDRITSOS

http://rav.jrc.it

European Conference: **eAccessibility by Voice**
Ispra 24-25 November

The JRC in the EU institutions

Court of Auditors

The European Parliament

Committee of the Regions

Court of Justice

The Council of Ministers

Economic and Social Committee

The European Commission

The 'College' of 20 Commissioners

DG 1 … External Relations

DG 3 … Enterprise

DG 11 Environment

DG 12 Research

JRC **Joint Research Centre**

DG 13 Information Society

DG 22 … Education and culture

DG 24 … Health and Consumer Protection

Portfolio of Commissioner P. Busquin

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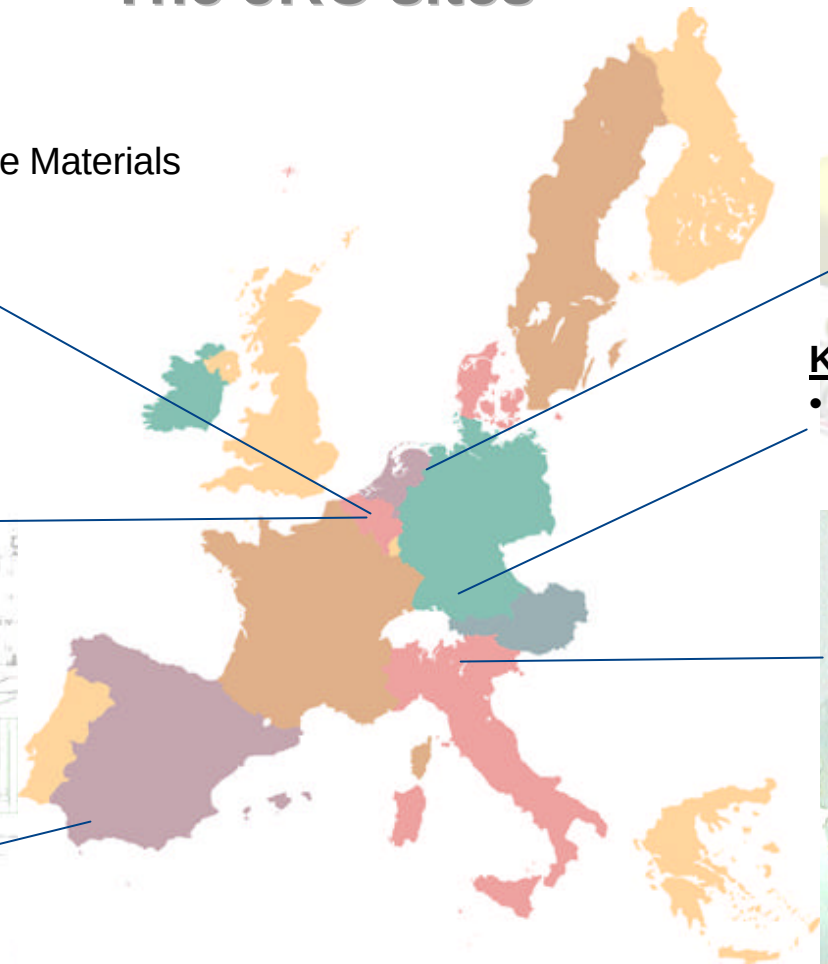
The JRC sites

Geel (B)
- Institute for Reference Materials and Measurements

Petten (NL)
- Institute for Energy

Karlsruhe (D)
- Institute for Transuranium Elements

Brussels (B)
- General Directorate
- Programmes Directorate



Ispra (I)
- **Institute for the Protection & Security of the Citizen**
- Institute for the Environment & Sustainability
- Institute for Health & Consumer Protection

Seville (ES)
- Institute for Prospective Technological Studies

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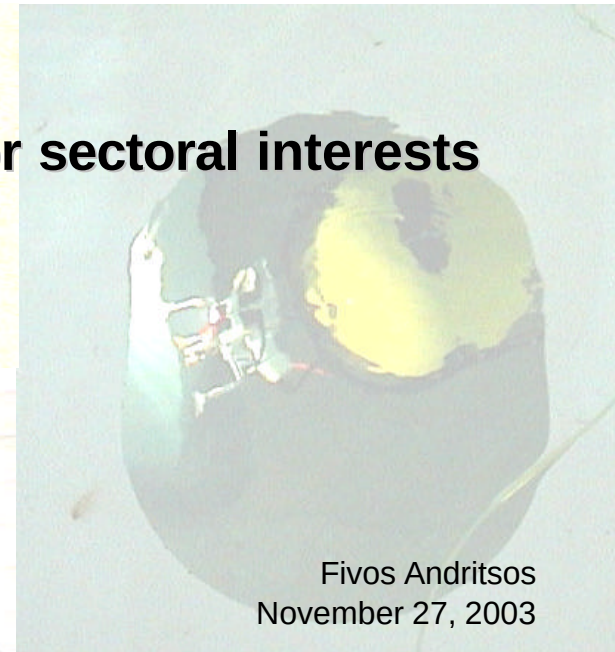
The mission of JRC

Provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies …. The JRC functions as a centre of science & technology reference for the EU, independent of commercial and national interests...

JRC offers:

Independence from national, industrial or sectoral interests

Scientific / technical excellence



RAV sector

Spin-off from former work for the Fusion program:

Novel IT systems for remote inspection, **monitoring and intervention**.

System's analysis, focused on:

Requirements analysis, the functional specifications and verification.

Interface with the final users / clients, quantify and formalize their requirements and proceed to the functional specification of the system.

Define the necessary acceptance / validation tests and procedures, which sometimes we perform or supervise. In so doing, we acquire and maintain a significant expertise in a wide range of technologies.

We have provided IPSC with considerable additional income:

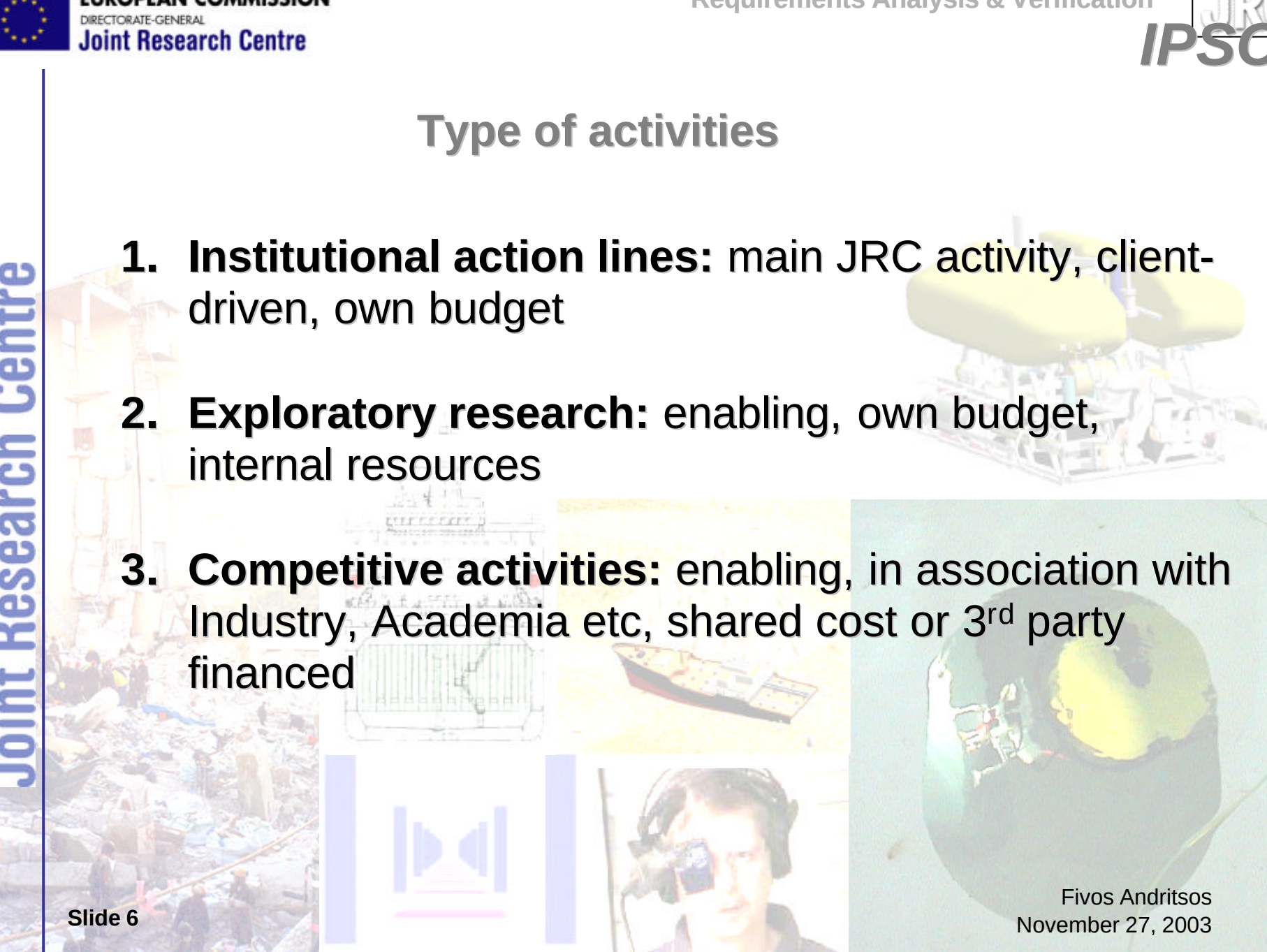
More than 3 M€ have been won; part of this budget has yet to be spent.

Type of activities

1. **Institutional action lines:** main JRC activity, client-driven, own budget

2. **Exploratory research:** enabling, own budget, internal resources

3. **Competitive activities:** enabling, in association with Industry, Academia etc, shared cost or 3rd party financed



PARREHA

The PARREHA project, co-sponsored by the European Commission's Joint Research Centre (JRC), aimed to develop a set of innovative **information technology tools** for the **rehabilitation and aid of people suffering from mobility problems because of the Parkinson's disease**.

Parkinson's disease is a movement dysfunction. Stimulation with "virtual" signals (visual and/or auditory) can help Parkinson's patients overcome their lethargy, leading to a sudden disappearance of all of the disease's symptoms. This phenomenon, called "**Kinesia Paradoxa**", is still not completely understood and is currently being studied by neurologists, with the help of advanced brain imagery.

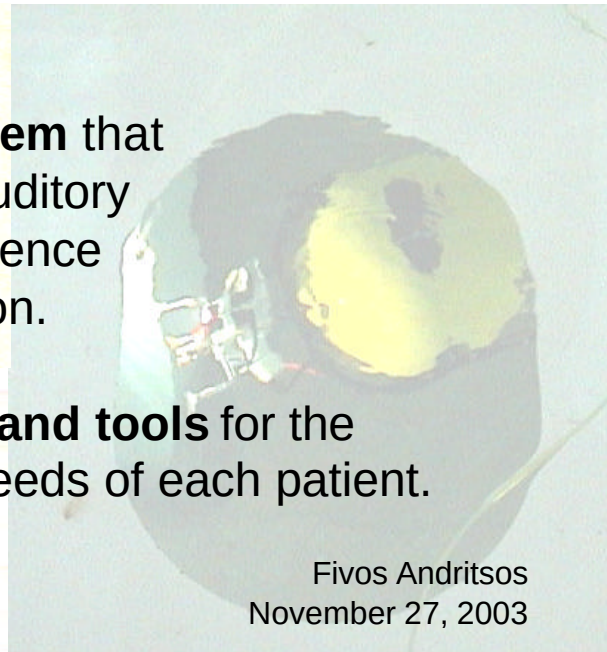
PARREHA

The PARREHA project has developed a set of personalised virtual reality tools that can significantly improve on the results of traditional rehabilitation schemes. It also acts as a mobility aid, significantly upgrading the quality of life for sufferers of Parkinson's disease. The project's achievements include:

1. Lightweight "**virtual reality glasses**", which, through personalised visual stimulation, provide exercises at home and a mobility aid in everyday life.

2. A virtual **reality exercise / training system** that incorporates virtual reality stimulation, auditory biofeedback and interactive video conference technologies to conventional rehabilitation.

3. Remote consulting, training **equipment and tools** for the tailoring of the VR tools to the specific needs of each patient.



PARREHA

VR system for Parkinsonians Rehabilitation

Cost: 3.5 M€, **340 k€** for the JRC

To be completed by March 2003

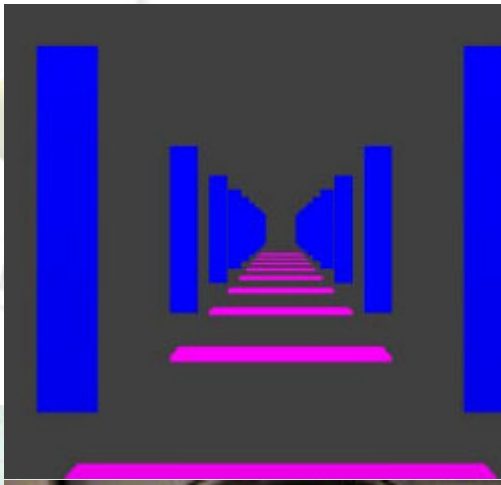
Audio and/or visual stimulation can unblock Pariksonians while in the ‘off’ state.

The project aims in providing a VR system serving as an exercise tool and mobility aid, complete with tailoring and communications tools.

The PARREHA system is based on:

(1) A pair of light VR glasses (mainly mobility aid)

(2) A fully immersive VR facility (for exercises)



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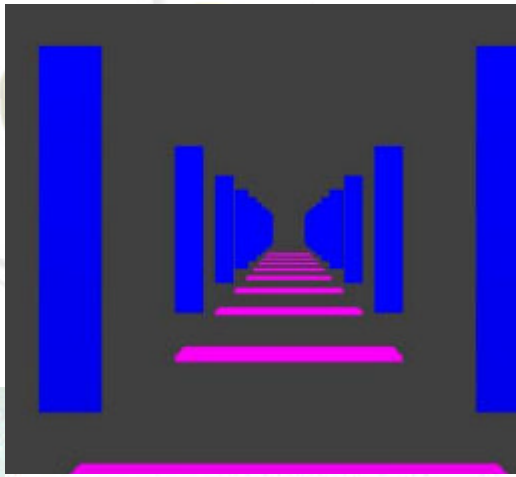
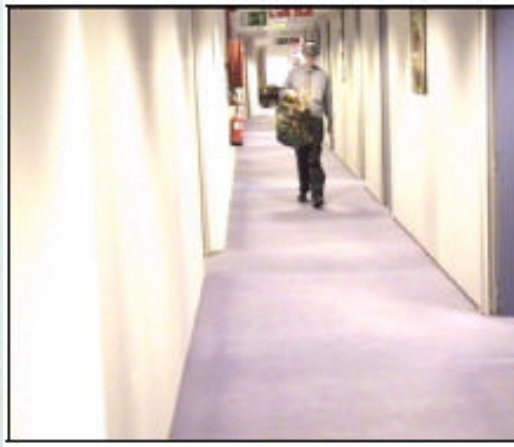
PARREHA

VR glasses – virtual corridor

The ‘right’ combination of visual and/or audio cues is highly ‘personal’ → VR playback sequence must be highly customizable.

The VR glasses must be very light and must not isolate the patient from its environment. In many case the peripheral vision is enough!





PARREHA

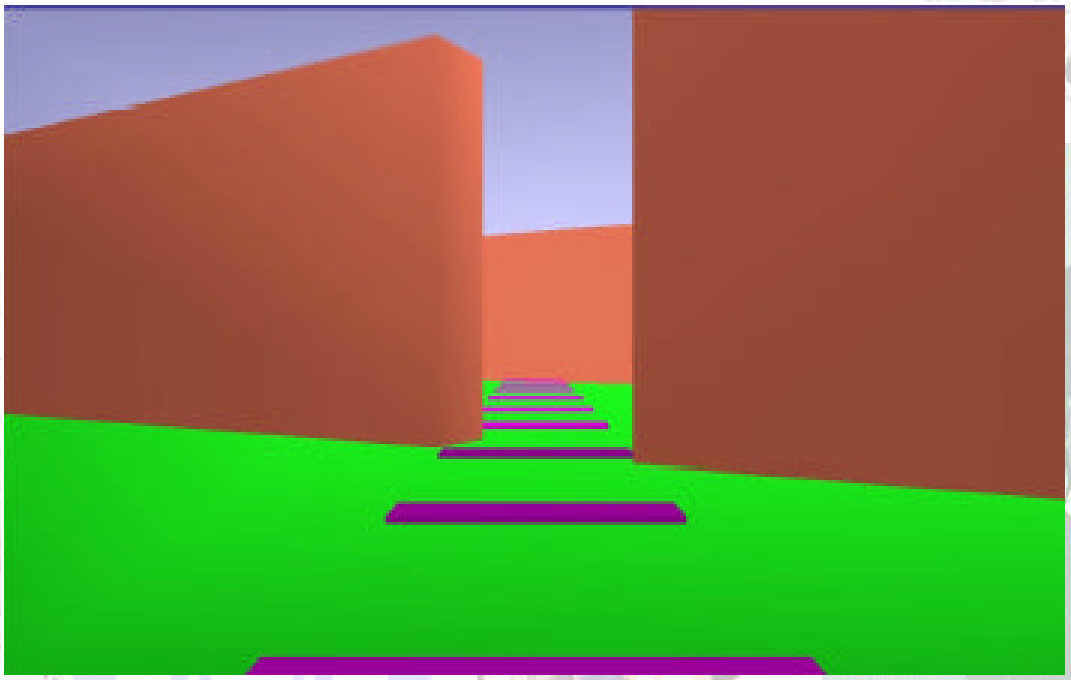
VR glasses – mobility aid

The VR glasses can improve the everyday life of many Parkinsonians while lessening their dependence from drugs!

PARREHA

Fully immersive VR facility – virtual room

Virtual exercise room where the patient can be trained in a controlled environment in various situations!



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PARREHA

Prototypes of the PARREHA virtual reality glasses have shown impressive results in bringing some Parkinson's sufferers from the "off-state" (lethargy) to the "on-state" (active).

The consortium managing the project is now undertaking activities to market the results commercially.