weather satellites. The committee, in a report due out early next year, is expected to recommend the launch of an interim satellite in 2005 or 2006 to plug the data gap; the topic is already under review at the White House.

Earth manager. Ghassem Asrar oversees NASA's Earth Observing System program.

Although most scientists would applaud such a mission, they point out that orbital mechanics prevent a single spacecraft from meeting all their needs. Researchers interested in land processes, for example, prefer a satellite that follows the path of the early sun, gathering data in the morning, before clouds set in. But those interested in clouds and humidity want data from the afternoon. One way to tackle the problem, says Asrar, is for NASA and U.S. scientists to work with overseas colleagues to develop "an international strategy," which might include a European platform.

In the meantime, many researchers remain unhappy about the EOS data system, which will control the onboard instruments as well as process, distribute, and archive data. The question of access divides investigators, who want a system tailored to their needs, and government officials, who also want it available to the public. The revamped system is far less cumbersome than the original concept—it was "monstrously overgrown," says Mahlman—and gives investigators much greater control over distributing and even processing their data. But the need to keep it open for public use rankles many. "You need different systems, one for gunslinger users and one that is friendly to high schoolers," says Mahlman, who says he resigned as advisory chair 3 years ago out of frustration with NASA's pace in revamping EOS. Last year Goldin, under pressure from Senator Barbara Mikulski (D–MD), vetoed further attempts to simplify the system and restrict access.

Scientists also chafe at the fact that well over two-thirds of EOS funding has been for hardware and feel that research has been given short shrift. "Is that cost effective and balanced?" asks Mahlman. Richard Somerville, a climatologist at the Scripps Institution of Oceanography in La Jolla, California, and a member of the NASA advisory panel, agrees. "It's a pity NASA is pinched when it comes to supporting research. The scientific payoff from the data could be greater," he adds, if more funds were devoted to research. But Asrar defends the allocation. More than 20% of his office's $1.4 billion has been set aside for data analysis, he says, a figure that he hopes will rise to 30% within a few years. When funding from other agencies such as the National Science Foundation is taken into account, he notes, "I think this issue goes away."

From the beginning, however, some scientists have wondered whether the huge investment in EOS will yield equally huge results. Bras is upbeat, but some scientists say the program is hobbled by the fact that it has served more as a wish list for researchers than an exercise to answer specific scientific questions. As a result, says Richard Goody, a Harvard planetary physicist who was involved in the early planning, "EOS will be helpful, and we will learn something from it, but I don't think it moves us to an objective of making predictions from climate models more believable."

Those debates are likely to remain contentious for years. But next week they will be set aside as researchers hold their breath and hope for a successful launch. "The stakes are very high," says Asrar. "The hopes and dreams of a large segment of the community are tied to this." **–ANDREW LAWLER**

EUROPEAN UNION

Research Chief Wants to Make Science Matter

Philippe Busquin wants science at the heart of EU decision-making, but Brussels bureaucracy doesn't give him much room to maneuver

BRUSSELS—Philippe Busquin, the European Union's new research chief, has a tough job ahead of him. For 2 decades, the EU has been pouring billions of euros into cross-border research projects, yet the community of European scientists remains fragmented and insular compared to their colleagues across the Atlantic. Research funding, on average, lags behind the United States and Japan; many postdocs would rather look for positions in North America than in another European nation; and because national governments jealously guard their right to make most of the big research funding decisions, the EU's research directorate has had a hard time bringing much cohesion to the European scene.

Busquin would like to change all that. He wants to encourage more mobility and cooperation among Europe's top researchers, overhaul some of the EU's own research labs and big-ticket science programs, and bring the directorate's scientific expertise to the heart of EU decision-making. "We must give a new dynamic" to European research, Busquin told *Science* in an interview last month. "There is a wide range of issues in which science should have a major input" in Europe, he said, but boosting that input will require more coordination among the science policies of the member states and other European organizations.

Can Busquin pull it off? In theory, he is well placed to put his stamp on European science. As one of 19 commissioners, he holds a position in the EU executive roughly equivalent to that of a Cabinet member in a national government. And as head of the EU's Framework 5 program, he commands a budget of nearly $4 billion a year—more than most research managers, such as the heads of the U.K. research councils or France's CNRS, have to play with. But even that amount represents less than 4% of Europe's total research spending, and it comes with some heavy political baggage. In general, the research ministries of France, the United Kingdom, Germany, and other major EU nations distrust the Brussels bureaucracy and keep a tight grip on decisions about "big-science" issues. Europe's major research facilities—including the CERN

Philippe Busquin. European research needs "a new dynamic."

CREDITS: (TOP TO BOTTOM) NASA; KARIM IBOURKI/PHOTO NEWS

particle physics lab, the European Molecular Biology Laboratory, and the European Synchrotron Radiation Facility—are governed by direct treaties among participating nations rather than by the EU.

Busquin, 58, who began his career as a physics lecturer, has been a politician for the past 2 decades. The political skills he honed as leader of the Socialist Party in Belgium's French-speaking region clearly will be needed in his new job.

He got off to a shaky start during confirmation hearings in September, when conservative members of the European Parliament threatened to scuttle the entire slate of new commissioners because they questioned whether Busquin—in the wake of the cronyism charges that plagued his predecessor, Edith Cresson—might be compromised by past financial scandals involving his Socialist Party in Belgium. But since then, Busquin has tried to build rapport with both the Parliament and his directorate. Unlike Cresson, whose main office was in the commission headquarters, Busquin has moved into the research directorate building. And the generally friendly reception he got last month at his follow-up appearance before the Parliament's research committee contrasted starkly with the harsh criticism he endured at his stormy hearing in September.

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At last month's hearing, Busquin outlined his priorities and promised to deliver a policy paper in January on his ideas for a "European research area"—an effort to make European research more cohesive, focused, mobile, and multilateral, as well as more open to women and young scientists. He hopes the document will spark a debate among European scientists, political leaders, and industry.

One issue that Busquin must face is the increasingly vocal complaints about the EU's flagship Framework 5 program, which funds cross-border projects in an array of fields. The Framework programs are popular among many researchers—especially those in the poorer EU member states, such as the Irish Republic, Portugal, and Greece—and the program is now open to scientists in 10 central and eastern European countries being groomed for eventual EU membership. This is increasing the competition for funds: In recent months, the research directorate has received more than 10,000 applications for Framework 5's first round of grants, and it will be able to fund less than 25% of them. "Our first impression is that [Framework 5] has been well received," says Busquin. But many European scientists have criticized Framework for being excessively bureaucratic, and Busquin said the research directorate "needs to take such complaints seriously," adding: "We want to become more cost-effective, but we also want high-quality research. It's not always an easy equation to solve."

Moving toward a solution will require some tougher policing of Framework 5. EU auditors last month criticized what they called "inaccurate declarations" and "insufficient controls" of EU research spending during Framework 4. In addition to such legacies, Busquin still has to deal with cantankerous national governments. European biologists recently attacked Framework 5 for withdrawing infrastructure funding from several life sciences facilities, including the European Mouse Mutant Archive (EMMA) near Rome. EMMA was set up using seed money provided by Framework 4, but member states—still determined to keep international facilities under their own control—decided earlier this year that Framework 5 should not pay for the infrastructure of facilities. That left EMMA starved of funding. Powerless to counter that decision, Busquin wants to "catalyze" efforts to help raise money for EMMA—for example, by arranging for funding by national research councils or outside scientific groups. He brought up EMMA at a 2 December meeting of European research ministers as an argument for the need to create more synergy among research efforts in Europe. An aide to Busquin told *Science* that, in the long term, Busquin "believes we need to rethink the concept of partnership between the commission and research infrastructures which are of European interest."

Also on Busquin's agenda is what to do with the EU's Joint Research Center (JRC). What began 40 years ago as a nuclear research facility has since evolved into a sprawling collection of eight institutes at several sites across the EU, covering everything from consumer protection to space science applications, at an annual cost of more than $1 billion. The European Parliament has criticized the JRC for being unfocused and for duplicating the work of national agencies, but Busquin thinks the center can play an important role in supporting EU policy-making. "We have to open up this [JRC] debate to include inputs from many others," he said. Busquin recently formed a group of scientists, European parliamentarians, and industry experts to scrutinize the JRC. But although Busquin and the commission have some leeway about the JRC's structure and its use of funds, the wider policy decisions about its mission are made at the political level by European leaders in consultation with the Parliament.

One area where Busquin wants EU facilities to play a larger role is that of food safety, following recent heated debates over beef infected with bovine spongiform encephalopathy, dioxin-laced poultry, and genetically modified crops. Commission President Romano Prodi has called for the creation of an EU-wide food safety agency. Busquin said he favors the concept, but he cautioned that the creation of a pan-European agency will face the same problem that hampers so many EU initiatives: how to bring coordination without treading on the toes of national governments, which have their own safety agencies and laws. Although food safety is only partially within his purview, Busquin believes the JRC could play a role in this area. He favors the creation of "a network of approved laboratories, so that we could have some degree of unity on how to tackle these food-safety issues, how to carry out the checks and controls that are needed."

As Europe enters the new millennium, Busquin says he wants science to be on the cutting edge of EU policy-making and its enlargement into central and eastern Europe: "Scientists and the research community have an essential role to play in a democratic world that is changing at a rapid pace."

–ROBERT KOENIG