he said, so why all the fuss? He thinks that neither the French nor the Soviet system "offers the resolution or timeliness that would pose a national security problem." However, if a company such as EOSAT does apply for a high-resolution (5-meter) device with "near real-time" image delivery capability, "then I see a potential national security problem." (At present it takes at least 3 to 7 days to obtain an image after placing a request with Landsat or SPOT, unless the scene has already been processed.)

It is difficult to define in advance a situation the government would consider risky, Thomas said. He suggested that a hostage rescue mission or an action like the invasion of Grenada might fit the bill, but he declined to speculate further. Recommending that everyone calm down and wait for a real test of the law, Thomas said he thought a "responsible applicant" would have no trouble getting a license.

One reason no one has invested in a "mediasat" is that it would be very expensive to do so, particularly if a legal challenge is part of the deal, and most news executives see no great need for the images it would produce. In a report last May ("Commercial Newsgathering from Space"), the Office of Technology Assessment cited an estimate by Hughes Aircraft that it would cost at least $215 million to set up an independent, high-resolution system for the media. Hughes also guessed it could cost as little as $20 million to piggyback a sensor on someone else's spacecraft, although this would mean some loss of autonomy. The author of those figures, Stillman Chase of Hughes' Santa Barbara office, now agrees that the job "probably can be done for less," and that this first look was "pretty superficial." But there still is no consensus on what it would cost. Some estimates hover around $50 million; others, from the builders of lightweight systems called "cheapsats" or "lightsats," are lower. One builder whose main customer is the military (and who wanted to remain anonymous) said it is "realistic" to think a high-resolution media satellite could be built for $5 million to $10 million. This could be done by using less exact geocoordinating equipment, since TV viewers do not require the same precision researchers do. Great uncertainty about the cost remains, however, because no one has commissioned a thorough study.

Meanwhile, as the United States mulls the alternatives, government agencies in other parts of the world are moving ahead with new Earth-observing satellites. Among those that seem definitely heading toward a launch, according to one international expert, are Canada, China, France, India, Japan, and the European Space Agency. Less firm or more secret plans are being discussed in Brazil, Indonesia, Italy, Sweden, and the United Kingdom. Many observers confirm that the old order dominated by the United States and the Soviet Union is about to disintegrate. For example, G. Lynwood May, former president of the American Astronautical Society and a visitor to China's satellite research center in June, expects China to launch a device with 5-meter resolution next year and market it aggressively. He says the Chinese already have 1-meter technology "in the lab" and may be prepared to launch it in the 1990s, if they find a demand for it.

One skeptic in government says, "I can't imagine any kind of mediasat that would be cost effective" with today's technology. But that does not mean that there won't be "lots of data floating around out there." On the contrary, there will probably be more than anyone will care to use. ■

ELIOT MARSHALL

British Government Rekindles Debate on Embryo Research

In a move that seems destined to reignite bitter controversy between Britain's biomedical research community and representatives of its "right-to-life" movements, the British government has announced that it will allow members of Parliament to decide whether or not research on human embryos should be allowed to continue.

The government's decision to allow a "free vote" on the question of embryo research, a relatively unusual procedure in British politics, is contained in a White Paper published in London last week. This sets out the details of legislation it intends to introduce covering all aspects of in vitro fertilization (IVF).

The main proposal in the White Paper is the creation of a a Statutory Licensing Authority, which would issue licenses to medical institutions and practitioners researching into and carrying out IVF treatment. The government also says it plans to make it a criminal offense for either clinicians or research workers to manipulate the genes of a human embryo, to clone such an embryo, or to create hybrid embryos.

Such moves have been welcomed by the Medical Research Council (MRC) and the Royal College of Obstetricians and Gynaecologists. For the past 2 years, the two bodies have jointly sponsored a Voluntary Licensing Authority, established after the report of a government-commissioned inquiry into IVF prepared by a committee chaired by Mary Warnock of Cambridge University.

The licensing authority has already drawn up guidelines that all MRC-sponsored research workers are required to follow on the use of human embryos, and procedures to be followed by all IVF clinicians operating under a voluntary license. The government is now proposing to turn these guidelines, and the licensing procedure, into legal obligations.

However, it has refused to take sides—as the MRC and much of the biomedical research community had been urging it to do—on the question of whether embryo research should be outlawed. Its White Paper merely suggests two alternative courses of action, one banning all such research and the other allowing it under circumstances approved by the licensing authority. It asks Parliament to decide which of the two should be adopted.

Two years ago, a private members bill sponsored by the right-wing member of Parliament Enoch Powell, which would have banned all research using human embryos, gave rise to a stormy debate in the House of Commons, in the course of which one MP broke an arm off the chair used by the speaker of the House. Eventually, the Powell bill was squeezed off the agenda by a series of Parliamentary maneuvers.

Feelings on the issue, however, continue to run high among groups that claim that even an embryo less than 14 days old—the legal limit recommended by the majority of members of the Warnock committee and since endorsed by the licensing authority—should be considered a full human being. The new bill, which will now be submitted to both the House of Commons and the House of Lords, therefore promises to result in an equally charged debate at some point next year.

A total ban on all research using embryos could have a significant impact on a range of topics, from inherited disease to infertility treatments such as IVF, since a substantial amount of such research is currently being funded by the MRC. "Although [such a ban] would mean that clinical IVF could continue, without the research to back it up the use of IVF is not going to progress very well," Jennifer Gumming, the secretary of the Voluntary Licensing Authority, said last week. ■ DAVID DICKSON