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TEN-METER RESOLUTION ISSUE

A. IDENTIFICATION AND DEVELOPMENT OF THE ISSUE

Current national space policy includes a 10-meter resolution limit as a baseline for commercial imaging satellites. NSDD-42, issued on 4 July 1982, spells out this constraint in the following words:

> Civil Earth-imaging from space, at resolutions at or better than ten meters, will be permitted under controls and when such needs are justified and assessed in relation to civil benefits, national security, and foreign policy."

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An interagency group under D/ICS/COMIREX aegis has examined the changes in the worldwide scene relative to civil remote sensing from space since the 10-meter baseline was established and concluded that the rationale for the 10-meter rule is no longer valid. In fact, the retention of this obsolete figure is now counter-productive to the national space policy objective of maintaining US technological leadership. Therefore the 10-meter constraint should be relaxed, or preferably completely eliminated.

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Background

The 10-meter rule as national policy dates back to 1978; prior to that time it had been 20 meters. The 10-meter figure was established after considering various contemporary foreign relations, technological, and other national security concerns and factors, the highlights of which can be summarized as follows.

A major foreign relations consideration was to allay the concerns of foreign countries about the unrestricted dissemination of high resolution US LANDSAT satellite imagery that would reveal details of their territory important to their economy or national security. In international forums these concerns were resulting in efforts to impose restrictions on the LANDSAT program operations. Among the less developed countries economic concerns were the dominant factors. It was feared that the US LANDSAT system would permit the United States and other major developed countries to unilaterally collect and unfairly exploit information about their minerals and other resources. The Soviet Union and the Warsaw Pact countries were concerned about the threat that unrestricted dissemination of high resolution satellite imagery would pose to the secrecy surrounding their military forces. They reluctantly accepted the capabilities of the US classified reconnaissance satellite program as long as its products were not declassified and openly distributed; however, they were concerned about other countries getting similar information from unclassified satellites. In 1977 the Soviet Union position was that only civil satellite imagery poorer than 50 meters should be disseminated without restrictions. Better resolution imagery would require the consent of the imaged country before being released to any other country.

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The 10-meter limit also provided considerable technological latitude for improving the resolution of the US unclassified civil satellite program. At that time the US LANDSAT program, with its 80-meter sensor, had a monopoly in providing the world with unclassified satellite imagery. To maintain the undisputed US technological lead in civil imaging systems from space, national space policy provided ample room for resolution increases. A 10-meter resolution was estimated to be around the level where significant intelligence about military installations and deployments would begin to surface.

Current Situation

The national space policy considerations, objectives, and concerns relevant to civil satellite imaging summarized above have been overtaken by events. The following points characterize the current situation.

- The ability to build and launch satellite systems that image the earth from space is no longer the exclusive domain of the United States and the Soviet Union. A number of foreign countries have operated or are planning to operate their own imaging systems.

- Both the existing 30-meter LANDSAT and the 10- and 20-meter French SPOT capabilities are based upon older technology. Technology available to all interested foreign countries permits development of imaging systems from space with resolutions considerably better than 10 meters. Further improvements in imaging capabilities by French, Japanese, Canadian, and European Space Agency systems are planned for the near future. These improvements will include better spatial resolution for photo systems and lower resolution day-night all-weather radar capabilities.

- The fact of higher-resolution imaging from space is now accepted worldwide. Foreign reactions to satellite imaging at higher resolutions have been tested by the 30-meter LANDSAT resolution since 1984 and the 10- and 20-meter resolutions of the French SPOT system since 1986. Despite the high visibility that the imagery from these systems have achieved, which included major Soviet installations that have never been seen in unclasssified media, no significant negative reactions have surfaced.

- The USSR has just announced its own program to sell 6-meter resolution satellite photographs of individual countries. The Soviet program may become a primary source for worldwide sales of good quality satellite photographic coverage, earning them foreign currency, prestige, and additional influence in many countries, and in addition, developing bilateral relationships that could facilitate Soviet collection of basic intelligence data.

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- As satellite imaging systems have become more sophisticated, the ability of nations to protect important military and economic security information from satellite systems has inevitably declined. This trend is less disadvantageous to open societies such as the US where national security thresholds are inevitably low, while working to the detriment of closed societies, such as the USSR, where national security thresholds are high.

- Applying the 10-meter constraint to any US licensee of a private sector satellite imaging system would make the US system unable to compete effectively against the aggressive foreign competition. Thus this constraint would be counter-productive to the US national space policy objective of maintaining (or more accurately, attempting to regain some) technological leadership in space remote sensing matters.

The 10-meter limit was never conceived as a hard and fast barrier. It was a limit judged to be reasonable at a particular point in time. In formulating NSDD-42, it was specifically recognized that changing circumstances could make it necessary to revise this 10-meter criterion, as the following text indicates:

"Civil remote sensing system constraints on spatial resolution, timeliness, spectral resolution, substantive content, or other appropriate parameters will be periodically reviewed to determine when policy constraints should be revised or imposed."

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The D/ICS-COMIREX-sponsored interagency group has reviewed the current situation and recommends revision, or preferably elimination, of the 10-meter constraint.

B. ALTERNATIVE POLICY OPTIONS

Four policy options are available. The arguments for and against each of these options are outlined below. None of these options have any direct budget impacts.

Option A: Retaining the present language of the NSDD-42 provision.

PRO:

- Current policy does not restrict development of systems with better than 10-meter resolution.
- Provides a specific figure that facilitates the approval or rejection of licenses. Provides an intelligence supported baseline. The criterion could not be deemed capricious because it is a long standing Presidential policy.
- National policymakers maintain maximum control. Decision-making on potential exceptions remains at the National Security Council level.

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CON:

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o The 10-meter criterion has been completely overcome by events on the international scene of civil satellite imaging. At the very least, the 10-meter criterion needs to be lowered.

Option B: Dropping the 10-meter spatial limit to a specific lower figure such as 5 or 3 meters.

PRO:

o Provides a specific figure that facilitates the approval or rejection of licenses.

o National policymakers maintain maximum control. Decision-making on potential exceptions remains at the National Security Council level.

CON:

o Technology is changing so rapidly that any resolution figure is arbitrary, difficult to obtain consensus on, and will probably become obsolete quickly.

o A resolution limit that is fixed at too poor a resolution level would tend to hinder potential US operators from being competitive with foreign systems.

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OPTION C: Adopting a "sliding rule" approach whereby the permitted resolution would be relaxed to a level competitive with foreign civil satellite imaging systems.

PROS:

o From a national security viewpoint the 10 meter level represents a particularly pertinent threshold for beginning to detect deployments of major military combat forces. Whether that level is breached specifically at 8, 6, or 4 meters is not as significant except for being able to differentiate specific categories of military equipment, e.g., one type of tank, artillery piece, or aircraft from another.

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- o Permits US operators to be competitive with foreign operators because adjustments on the resolution figure will invariably be in direction of better resolution.
- o More flexible than Options A or B in that it would not require continuing evaluation at the National Security Council level.
- o Would probably be practical and reasonable for several years.

CONS:

- o Would require additional effort on part of licensing authority to monitor and assess the details of evolving technology, most of which are not significant from an overall national and international perspective.

OPTION D: Complete elimination of any spatial resolution.

PRO:

- o Maximizes potential for achieving national space policy objective of demonstrating US technological excellence. The context of an unclassified civil satellite remote sensing program is especially desirable for maximum impact on world opinion.
- o Provides maximum flexibility and opportunity for US potential operators to compete with foreign operated systems. Superior US systems will probably result in US retaining greater share of value-added activities, to the benefit of US economy.
- o Resolution will be determined by market mechanism. Cost-benefit ratio considerations will tend to limit actual resolution -- probably to the 3 to 5 meter range.
- o Completely eliminates any need for establishing administrative/bureaucratic mechanism to evaluate evolving technology.
- o Given the ongoing increasingly extensive operations of foreign unclassified systems such as SPOT and classified systems such as the Soviet satellites, national security concerns about US and Allied military forces and installations will need to be protected by concealment measures rather than by unilateral constraints on only US operated systems
- o Ad hoc restraints/constraints on timeliness of imagery collection and timeliness of disseminating data are more critical than constraints on resolution.

CONS

- o Surrenders all control with reference to resolution limits.

C. RECOMMENDED LANGUAGE:

Option D. Language to replace VII. b. and c. of INTER-SECTOR RESPONSIBILITIES Section as follows:

Civil Earth-imaging from space, at resolutions competitive or superior to foreign-operated civil systems, will be encouraged. Constraints on substantive content, geographic areas, or other appropriate parameters will be minimized. The imposition of such constraints will require the decision of the Secretary of Defense or the Secretary of State.

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ALSO THE ABOVE REVISED PROVISION SHOULD BE MOVED FROM THE "INTER-SECTOR RESPONSIBILITIES" SECTION TO THE "CIVIL SPACE POLICY" SECTION.

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