

# The promise and problems of the Land Remote Sensing Policy Act of 1992

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**After nearly a decade of attempting to guide the complex process of land remote sensing in the US, the 1984 Land Remote Sensing Commercialization Act was repealed. In its place, Congress passed the Land Remote Sensing Policy Act of 1992. This action was prompted by what many observers consider a failed attempt at commercialization and the inability of the old law's provisions to meet the compelling needs of scientific research. The new law attempts to address these failures and, in many respects, is successful. Nonetheless it still embodies some of the problems associated with the earlier law. This article compares the provisions of the two laws and provides an analysis of the new law's strengths and weaknesses.**

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On 5 October 1992, the Land Remote Sensing Policy Act of 1992 (Policy Act)<sup>1</sup> was passed, repealing<sup>2</sup> the Land Remote-Sensing Commercialization Act of 1984 (Landsat Act).<sup>3</sup> The new law demonstrates that the US national understanding of the value of remote sensing technology has matured. As the new law's name indicates, long-term remote sensing policy – and its numerous facets – has become the focus of national decision making rather than a single use. Specific matters addressed by the Policy Act include programme management;<sup>4</sup> Landsat 7 procurement;<sup>5</sup> Landsat 4 to 7 data policy;<sup>6</sup> transfer of Landsat 6 programme responsibilities;<sup>7</sup> regulatory authority and administration of public and private remote sensing systems;<sup>8</sup> federal research and development;<sup>9</sup> advanced technology demonstration;<sup>10</sup> Landsat 7 successor systems;<sup>11</sup> data availability and archiving;<sup>12</sup> and, the continued prohibition of weather satellite commercialization.<sup>13</sup> As a whole, the new legislation has four primary features: a focus on the value of remote sensing in conducting global change research and other public sector applications; a retreat from the attempted commercialization of remote sensing as practised since 1984; a more formal merger of national security and environmental remote sensing activities; and provisions for the future evolution of remote sensing policy.

However, the expanded awareness of remote sensing's value is still accompanied by some familiar problems that threaten to limit the new law's promise. The most significant specific matter left unaddressed by the Policy Act is funding. Many of the legislation's major provisions, like the management programme, continued research and development, and the technology demonstration programme, require adequate fund-

<sup>1</sup>15 U.S.C. 5601 et seq. (1992).

<sup>2</sup>*Ibid.* sec 4.

<sup>3</sup>15 U.S.C. 4201 et seq.

sensing technology to the quality of life on Earth.<sup>14</sup> The new law recognizes that Landsat data has research value to educational institutions and non-profit public interest entities<sup>15</sup> as well as to federal governmental researchers and that 'the cost of Landsat data has impeded [its] use for scientific purposes.'<sup>16</sup> Availability of unenhanced Landsat data to US government-supported researchers and agencies is the 'minimum' standard set by the act with full availability of Landsat 7 data 'to all users at the cost of fulfilling user requests' its long-term objective.<sup>17</sup> Its one-year objective is to make Landsat 6 data availability 'consistent with the Landsat 7 data policy.'<sup>18</sup>

Unlike the Landsat Act, which only tersely acknowledged the environmental applications of remote sensing data,<sup>19</sup> the first congressional finding in the Policy Act declares that data from space 'are of major benefit in studying and understanding human impacts on the global environment.'<sup>20</sup> Global change research and the United States Global Change Research Program (USGCRP) are both specifically cited as activities to be supported by the acquisition of unenhanced Landsat data.<sup>21</sup> Research needs contained in the Global Change Research Act of 1990 are adopted as Policy Act mandates.<sup>22</sup>

Despite the new law's recognition of the data needs of educational and non-profit institutions statutory data distribution details are scant. A detailed data distribution plan will evolve in the give-and-take of negotiations among government agencies, the government and the Landsat 6 contractor, and the US government and foreign global change research partners. As noted in the Senate hearings on the Policy Act, 'there is no guarantee that a negotiated agreement will' embody a dissemination policy consistent with the free flow of information from the government to its citizens.<sup>23</sup> The interests of academics and non-profit institutions – many of whom are engaged in important research unrelated to global change – will be underrepresented, if at all, in these talks. The result could be the continued 'unwilling[ness] to provide the fantastic data we have already collected to the research community at a cost they can afford.'<sup>24</sup>

The question of whether the Act's emphasis on global change research is the best way for remote sensing to address global change is also raised by the new law. The Act's focus on remote sensing's value for global change research may augment the inertia characteristically inherent in difficult political decisions allowing policymakers to feel justified in waiting until sensors provide an unattainable level of scientific certainty rather than initiating short-term responses to climate change.<sup>25</sup> The problem however, lies less with the Act's provisions and more with those entrusted to carry it out. Lack of will to make hard political choices is a poor reason for lowering legislative standards. However, another potential problem – unstable support due to the long-term nature of global change research<sup>26</sup> – is more complex and involves public awareness as well as political acceptance. Despite favourable short-term support,<sup>27</sup> it is yet to be seen whether the public is

<sup>14</sup>Sec 5601 (1). This was acknowledged in the opening statement of Representative James H. Scheuer, during the Policy Act hearings: 'I am very hopeful that we can also engage in some more detailed discussions about the Landsat data policy and how we may be able to balance the seemingly competing demands of commercialization and the urgent needs of the environmental research community for the Landsat data. Clearly, the needs of global climate change research and environmental monitoring must also be met.' The Landsat Program Management Plan and H.R. 3614, The National Land Remote-Sensing Policy Act of 1991, 102d Cong, 2d Sess 13, 18–21, (1992) [hereinafter, Hearings], p 2. The importance of remote-sensing data for 'understanding . . . the environment' was also the first purpose of the Policy Act cited by President Bush when he signed it into law. 138 Cong Rec 3505 (1992).

<sup>15</sup>*Op cit*, Ref 1 sec 5613 (2) (6).

<sup>16</sup>*Op cit*, Ref 1, sec 5601 (4).

<sup>17</sup>*Op cit*, Ref 1, sec 5601 (13).

<sup>18</sup>*Op cit*, Ref 1, sec 5613 (a).

<sup>19</sup>H.R. Rep. No. 98-647, 98th Cong., 2d Sess. p 8 (1984). S.2297 The Land Remote Sensing Policy Act of 1992, 102d Cong., 2d Sess. (1992), [hereinafter, Senate Hearings]. '[T]he environmental research community was largely ignored in the development of the 1984 Landsat Act.' Opening statement of Senator Albert Gore, p 2.

<sup>20</sup>*Op cit*, Ref 1, sec 5601 (1).

<sup>21</sup>*Op cit*, Ref 1, sec 5611 (c) (4).

<sup>22</sup>*Ibid*.

<sup>23</sup>Senate Hearings, p 5. Opening statement of Senator Larry Pressler.

<sup>24</sup>Senate Hearings, p 2. Opening statement of Senator Albert Gore.

Act reveals a mindset, possessed by some in the legislative process, that saw the Landsat satellites as a drain on public coffers and, if unsuccessfully operated by the private sector, worthy of being discontinued. The Policy Act recognizes that using public funds for remote sensing satellites is a national investment that makes long-term commercialization by the private sector possible.

Ironically, the 1992 law makes significant progress toward 'proper involvement of the private sector'<sup>28</sup> – a goal of the 1984 law, the provisions of which doomed its attempt at commercialization by a short-term perspective that, while recognizing the role of the value-added industry in developing data markets,<sup>29</sup> focused primarily on the space-based hardware. The Policy Act acknowledges that 'full commercialization of the Landsat program cannot be achieved within the foreseeable future and thus should not serve as the near-term goal of national policy on remote sensing.'<sup>30</sup> It sets the parameters for successful commercialization as a 'long-term goal'<sup>31</sup> with 'a viable role for the private sector in the promotion and development of the commercial market for value-added and other services'<sup>32</sup> including operating US ground stations<sup>33</sup> and 'other means for direct access'<sup>34</sup> to unenhanced data from government satellites, and utilizing government satellites on a space available basis.<sup>35</sup> In the short-term, preference is expressed for the private sector in performing value-added activities<sup>36</sup> and, in the long-term, for funding and managing a Landsat 7 follow-on system.<sup>37</sup>

A recent development – the granting of a commercial remote sensing licence by the Commerce Department to the WorldView Imaging Corporation – has set the stage for a potential challenge to the Act's assertion that the success of a private space-based system is only likely in the distant future.<sup>38</sup> WorldView has been followed by two additional companies currently in the process of obtaining a licence.<sup>39</sup> If any of these companies prove viable without government subsidies, unlike the current situation with the Landsat 6 contractor, then a whole new era of private commercial remote sensing may be possible.

The Act's most important advance for private system operators – and the reason why the three private companies applied for licences almost immediately after its passage – is that they have more control over building a clientele. Private companies are now only required to make unenhanced data available to the governments of sensed states<sup>40</sup> unlike the Landsat Act which required that raw data be made available to 'all potential users on the same terms.'<sup>41</sup>

## US Foreign policy

The converse effect of requiring private operators to make data available only to sensed states is that it commits the USA to the foreign policy aspects of non-discriminatory access. By requiring private companies to make data available to sensed states 'as soon as [they] are available and on reasonable terms and conditions'<sup>42</sup> the Policy Act

<sup>28</sup>*Op cit*, Ref 3, sec 4202.

<sup>29</sup>*Op cit*, Ref 3, sec 4201 (8).

<sup>30</sup>*Op cit*, Ref 1, sec 5601 (6).

<sup>31</sup>*Ibid*.

<sup>32</sup>*Op cit*, Ref 1, sec 5613 (a) (7).

<sup>33</sup>*Op cit*, Ref 1, sec 5615 (b) (1).

<sup>34</sup>*Op cit*, Ref 1, sec 5615 (b) (2).

<sup>35</sup>*Op cit*, Ref 1, sec 5625 (a).

<sup>36</sup>*Op cit*, Ref 1, sec 5601 (14) (15).

<sup>37</sup>*Op cit*, Ref 1, sec 5641 (c).

<sup>38</sup>WorldView's technology and personnel are from Lawrence Livermore National Laboratory. A partnership agreement with a privately owned high-technology firm, CTA, is being negotiated. 'WorldView, CTA Forge Partnership for Imaging Satellites', *Space News*, 17–23 June 1993, p 16, col 1.

<sup>39</sup>Scott Pace, Department of Commerce, Office of Space Commerce Programs, 21 May 1993. Telephone communication. The two companies which subsequently went public about their licence applications are Lockheed and Orbital Sciences.

<sup>40</sup>*Op cit*, Ref 1, sec 5622 (a) (2).

<sup>41</sup>*Op cit*, Ref 3, Sec 4242 (2).

<sup>42</sup>Sec 5622 (b) (2).

<sup>43</sup>Sec 5601 (a) (1). Sec 5602 (2) defines

data for free.<sup>44</sup> Although 'financial self-sufficiency for Landsat' did prompt NASA to charge ground station fees,<sup>45</sup> under the non-discriminatory access policy data prices still remained low prior to 1984.<sup>46</sup> With the advent of the Landsat Act, the non-discriminatory access policy was distorted into a rationale for equally charging all users substantially higher data prices. As a result Landsat data became unaffordable to many developing nations. Non-discriminatory access – as a foreign policy – was seriously weakened, denying data to a number of foreign users<sup>47</sup> and denying the USA a practice which had resulted in foreign good will, enhanced intergovernmental relationships, and the democratization of foreign institutions through making data with economic, political and environmental value available to other nations.<sup>48</sup>

During the congressional debate over a Policy Act amendment that 'attempt[ed] to strike a balance between international treaty obligations to maintain non-discriminatory access [and the] interests of private sector firms'<sup>49</sup> the foreign policy value of remote sensing data was recognized as 'a very sensitive matter involving agreements which have been reached over the years between the State Department and other nations.'<sup>50</sup> However, the debate fell short of the full consideration the subject deserves due to the absence of a State Department witness.<sup>51</sup> A letter regarding the State Department's view of the issue was sought<sup>52</sup> but never materialized for indeterminate reasons.<sup>53</sup> Whatever the cause, the lack of a recorded formal State Department position demonstrates the need for both the legislative and executive branches to formulate, and implement, a coherent post-cold war foreign policy for remote sensing. In the information age, providing remotely sensed data to foreign countries is analogous to the cold war policy of providing foreign aid to establish economic and political alliances.

### National and environmental security

The new law recognizes that 'Landsat data are particularly important for national security purposes and global environmental change research'<sup>54</sup> and presages what may become more common in the future: a dovetailing of national security and environmental institutions and activities. This, and many other aspects of defence conversion, will be a major challenge for the USA in the 1990s. The post-Cold War draw-down of military forces will release large amounts of human and technological resources into the national economy. In the case of remote sensing the Policy Act authorizes the president to declassify intelligence satellite technology for the Landsat demonstration programme.<sup>55</sup> It is unrealistic to expect that the civil space programme – which is minuscule compared to the enormous size of the defence establishment – will be able to, or should, absorb all of the newly-available resources. However, some conversion is certain and it may be necessary to create new kinds of institutions to facilitate it. The Landsat Program Management provisions are specific enough to provide a possible model for doing so.

<sup>44</sup>P. Mack, *Viewing the Earth – the Social Construction of the Landsat Satellite System*, The MIT Press, Cambridge, MA, 1990, p 189.

<sup>45</sup>*Ibid*, p 192.

<sup>46</sup>Remote Sensing and the Private Sector: Issues for Discussion – A Technical Memorandum, Washington, DC: US Congress, Office of Technology Assessment, OTA-TM-ISC-20, March 1984, p 60.

<sup>47</sup>Foreign data use has declined due to cost increases and concern over which entity will control long-term data distribution. Ron Beck, Technical Information officer, EROS Data Center, 25 June 1993. Telephone Communication.

<sup>48</sup>*Op cit*, Ref 44, pp 31–32, 104–108.

<sup>49</sup>Hearings, p 210.

<sup>50</sup>*Ibid*.

<sup>51</sup>*Ibid*, pp 54, 210–211. The record is unclear as to why a State Department witness did not testify. '[C]onversations with the Administration' about the State Department's opinion were mentioned by Representative Robert S. Walker. The State Department also did not appear at the Senate hearings, Senate Hearings.

<sup>52</sup>*Ibid*, pp 210, 211.

be best served by ensuring that Landsat remains an unclassified program that operates according to the principles of open skies and nondiscriminatory access.<sup>58</sup> The management programme will be equally funded by NASA and DoD and must report to Congress in October 1993, and biennially thereafter, regarding public comments about system use, volume of use and recommendations for policy and programmatic changes. Management responsibilities include contract oversight; bringing Landsat 7 online; operating the Landsat system; meeting the requirements of the Global Change Research Act of 1990; and coordinating an advanced remote sensing technology demonstration programme.<sup>59</sup> Both NASA and DoD acknowledge that 'continuous coordination in all aspects of the program' is critical for meeting management responsibilities.<sup>60</sup> To do so 'each organization will have individuals residing in the project office of their counterpart, and in a jointly staffed coordination facility in the Washington D.C. area . . . [and] a jointly chaired Landsat Coordinating Group will . . . oversee interactions on top-level program plans, budget execution and policies; handle interagency matters related to the program; staff any issues requiring adjudication at senior departmental levels; and coordinate any reports to Congress.'<sup>61</sup>

Together, these specifications establish a high-level, open, accountable, hybrid institution with a long-term integrated mission that can evolve as circumstances require. It can serve state and local government agencies, academic institutions, industry, and non-profit organizations expanding the possibilities for institutional experimentation. A director and personnel, who have an innate sense of national service and enough funding to enable them to transcend interagency turf battles and buck special interests, must be provided and will be essential to ensuring the Management Program's success.

Early indications are that despite the detailed management plan, the Landsat programme may continue to be plagued by the 'decade-long debate over who should pay for the system.'<sup>62</sup> Although the first funding crisis was resolved to the benefit of the programme, the dispute revealed that erratic funding, local state interests and scepticism that a joint programme can work are still part of Landsat's problems.<sup>63</sup> Other potential problems stemming from different user needs and cultures in DoD and NASA are evident in their disagreement over proposed sensor resolution for a Landsat 7 instrument.<sup>64</sup>

### **Future policy evolution**

One of the strongest features of the Policy Act is the way it provides for following through on its initial mandates. The Landsat Act merely provided for a nebulous three-phase commercialization process.<sup>65</sup> In comparison, to ensure that the long-term objective of 'continuity of Landsat coverage into the 21st century'<sup>66</sup> is met, specific short-term dates have been set in the text of the Policy Act by which interim

<sup>58</sup>*Op cit*, Ref 1, sec 5601 (10).

<sup>59</sup>*Op cit*, Ref 1, sec 5611.

<sup>60</sup>Hearings, pp 18-21.

<sup>61</sup>*Ibid*, p 13.

<sup>62</sup>'Landsat Funding Dispute Revived', *Space News*, 5-11 April 1993, p 17, col 1.

<sup>63</sup>'Mikulski, Stokes OK Landsat Transition', *Space News*, 12-18 April 1993, p

to Congress by 15 July 1994<sup>70</sup> and options for a Landsat 7 follow-on system must be submitted to Congress by 1997.<sup>71</sup> The technology demonstration programme must demonstrate advanced sensor capabilities and launch advanced remote sensing components within five years.<sup>72</sup> All of these activities require specific periodic reports to Congress. Anticipating the completion of these specifics, the Policy Act lists a spectrum of options to be reviewed in five years for the future of remote sensing: establishing an international remote sensing consortium, government funding and management of remote sensing systems; private sector funding and management for non-government systems, and cooperation between the public and private sectors.

Early deadlines have been met. Negotiations between the Landsat 6 contractor and the government began on time<sup>74</sup> and, as of this writing,<sup>75</sup> they appear to be continuing. Early reports were that an impasse had been reached. More recently negotiation participants indicate there may be 'room for agreement'.<sup>76</sup> Continued respect for statutory deadlines – and the new law's substance – will be severely tested in the event that the government and the Landsat 6 contractor fail to conclude an agreement by 30 September 1993. Although Landsat Management must recommend alternatives to Congress within 30 days,<sup>77</sup> the Act omits an implementation timetable for the alternatives which can allow them to languish due to lack of follow-through.

### Oversight and advice

Congressional micromanagement – the bane of many a technology development programme – is alleviated for the Landsat Program Management in the Policy Act which gives it unhindered contract authority for private sector services, including satellite operations and data preprocessing.<sup>78</sup> Under the Landsat Act, before the Commerce Department could let a contract for data marketing services the contract had to be reviewed by the controlling Senate and House committees.<sup>79</sup>

Arguably the most innovative measure in the Policy Act – completely without precedent in the Landsat Act – is the Landsat Advisory Process. The Landsat Management Program 'shall seek impartial advice . . . from a broad range of perspectives'.<sup>80</sup> Perspectives are to be drawn from state and local government agencies, academia and business,<sup>81</sup> as well as from a 'broad diversity' of people from across age, gender and race.<sup>82</sup> Hopefully it will be this drive for fresh thinking and new blood that will guide the establishment of the Landsat Management Program itself.

Early signals are mixed regarding the establishment of a genuine process of ongoing diverse, informed counsel. Although there was a request for comment published in the Federal Register it was short-lived and little noticed.<sup>83</sup> However, announcements were also published in trade journals and it is still possible to contact the Landsat Advisory Process coordinator directly to submit recommendations.<sup>84</sup> In order to cut costs and bureaucracy there is a general trend towards decreasing

<sup>70</sup>*Op cit*, Ref 1, sec 5615 (c).

<sup>71</sup>*Op cit*, Ref 1, sec 5641.

<sup>72</sup>*Op cit*, Ref 1, sec 5633.

<sup>73</sup>*Op cit*, Ref 1, sec 5641.

<sup>74</sup>A short meeting was held to satisfy statutory requirements. Actual negotiations began after 5 November 1992. Pete Didisheim, Deputy Chief of Staff, House Committee on Science Space and Technology, 20 January 1993. Telephone communication.

<sup>75</sup>This paper had to be in the publisher's office 1 July 1992.

<sup>76</sup>'Continued progress is connected to the Landsat 6 contractor producing a reasonable proposal for data access by the US Government and its affiliated users.' Lisa Shaffer, Acting Associate Administrator for External Coordination Office of Mission to Planet Earth, NASA, 10 June 1993. Telephone communication. The Landsat 6 contractor management has acknowledged that 'the government . . . has a right to quote their scientists quite a different price structure [and] science investigators, public interest [sic] they need the data at a lower price', *Space*, April 1993, Vol 9, No 2, p 21.

<sup>77</sup>Sec 5613 (b).

<sup>78</sup>*Op cit*, Ref 1, sec 5611 (d).

<sup>79</sup>*Op cit*, Ref 3, sec 4212.

<sup>80</sup>*Op cit*, Ref 1, sec 5611 (e) (1).

<sup>81</sup>*Op cit*, Ref 1, sec 5611 (e) (1) (B).

<sup>82</sup>*Op cit*, Ref 1, sec 5611 (e) (1) (C).

<sup>83</sup>Notice 92-79, 58 Fed. Reg. 587 (1993). Comment period was from 6 January 1993

community were sought and received regarding archiving and data policy. Additional sessions are planned for the future.

### **International implications**

The new law has implications for international remote-sensing activities because it sets regulations which can clarify the 1987 UN Principles Relating to Remote Sensing of the Earth from Space (Principles);<sup>86</sup> affects current and future cooperative missions; raises the possibility of US participation in an international remote-sensing consortium; and raises the issue of the appropriate military/civilian relationship in international remote-sensing partnerships.

#### *The Policy Act and the UN Principles*

As a major remote-sensing nation, the domestic legislation of the United States has persuasive authority for the development of international remote-sensing law similar to the way that practices of strong maritime nations influenced the development of international maritime law.<sup>87</sup> The Policy Act addresses some issues left ambiguous by the Principles. Among them are protecting the Earth's environment through remote sensing; the role of the private sector in carrying out the Principles; and providing remote-sensing assistance to developing nations.

*Protecting the Earth's environment through remote sensing.* A driving force behind the repeal of the Landsat Act was its lack of attention to the environmental value of remote sensing.<sup>88</sup> Replacing the Landsat Act with a law that stresses the environmental value of remote sensing conforms with the 'positive duty on sensing states to avoid harm to the Earth's natural environment'<sup>89</sup> articulated by the Principles.<sup>90</sup>

*Private sector obligations and the UN Principles.* Prior to the Policy Act, the US position that had 'probably' been accepted was that Principle XII, the 'dissemination statute', applied only to data from states,<sup>91</sup> leaving the obligation of a 'private entity under national jurisdiction' to make data available an open question.<sup>92</sup> Now timely access by any sensed state to at least one Principle XII data category produced by the private sector – primary data – is required by the Policy Act. Whereas the Landsat Act did 'not impose a time constraint on the operator as do the Principles'<sup>93</sup> the Policy Act's licensing conditions do correspond to the Principles' time constraints<sup>94</sup> by requiring that access occur 'as soon as such data are available'.<sup>95</sup>

The Policy Act may also require private operators, on a case-by-case basis, to make unenhanced data available on terms similar to that applied to the Landsat system or other government systems due to 'the importance of promoting widespread access to remote sensing data from United States and foreign systems'.<sup>96</sup> This, in turn, would allow the

<sup>86</sup>G.A. Res. 41/65, 42 UN GAOR Annex (95th plenary meeting) at 2 UN Doc A/RES/41/65 (1987).

<sup>87</sup>H. DeSaussure, 'Remote Sensing Satellite Regulation by National and International Law' 15 *Rutgers Computer & Technology Law Journal* 351, p 376.

<sup>88</sup>'Landsat Act is a Failure', *Space News*, 16 July 1990, p 15, col 1.

<sup>89</sup>*Op cit*, Ref 87, p 361.

<sup>90</sup>*Op cit*, Ref 86, Principles X and XI.

<sup>91</sup>The rationale was that proprietary data from private systems was not 'available' to the State, therefore it was unavailable for purposes of the Principles. S. Neil Hosenball, 'ABA Workshop on Current Developments in Remote Sensing Law and Practice', presentation, Colorado Springs, CO, 7 April 1990.

interests . . . of foreign users'.<sup>98</sup> Landsat 7 data policy will require 'timely and dependable delivery of unenhanced data to . . . foreign users'.<sup>99</sup> Federal agencies, particularly NASA, DoD, and the Departments of Agriculture and Interior have mandates to continue remote-sensing research and development which can extend to cooperation with foreign governments and international organizations.<sup>100</sup> This authority can be exercised to develop the nature and extent of the obligations contained in the Principles which include promoting international cooperation, creating opportunities for international participation, establishing and operating facilities for data collection, storage and processing, promoting regional agreements and providing technical assistance to states and the UN.<sup>101</sup>

'[P]articular consideration [of] the needs of the developing nations',<sup>102</sup> as required by Principle XII, is specifically 'authorized' for US government agencies which are 'encouraged to provide remote sensing data, technology, and training to developing nations'.<sup>103</sup> Agencies are also authorized to utilize excess government civilian remote-sensing capabilities to carry out their missions<sup>104</sup> which gives them access to technology that could provide necessary infrastructure for international aid programmes.

#### *The Policy Act and current and future cooperative missions*

The 1992 Policy Act codifies a data policy for the Landsat system similar to one that had been set in 1991 by the management of the international Earth Observing System (EOS). The concept of 'affiliated research users' allowed some researchers to have access to EOS and foreign partner programme data for the cost of reproduction.<sup>105</sup> The new law provides that the US Government and its affiliated users will also have access to data from Landsats 4 through 6 for non-commercial use 'at the cost of fulfilling user requests'.<sup>106</sup> Under the Policy Act 'affiliated users' include USGCRP researchers, researchers in programmes that are the 'international counterpart' of the USGCRP, and 'other researchers and international entities' that have agreed, in writing, to use Landsat data for non-commercial purposes.<sup>107</sup> The Act states that Landsat 7 data distribution should be even broader, making data available 'to all users at the cost of fulfilling user requests'.<sup>108</sup> Landsat 7's data distribution system must also be compatible with the Earth Observing System Data and Information System (EOSDIS) 'to the extent possible'.<sup>109</sup>

#### *The Policy Act and an international remote sensing consortium*

The idea of an international satellite monitoring agency (ISMA) was first proposed by the French to the UN General Assembly in 1978<sup>110</sup> and in 1988, the US and France entered into preliminary discussions about the merger of their respective systems.<sup>111</sup> Landsat Act commercial issues brought the talks to an end. The Policy Act has resolved some of those issues and raises 'an international consortium for the funding and management of a successor land remote sensing system' as an

<sup>98</sup> *Op cit*, Ref 1, sec 5611 (c) (2).

<sup>99</sup> *Op cit*, Ref 1, sec 5615 (a) (2).

<sup>100</sup> *Op cit*, Ref 1, sec 5631.

<sup>101</sup> *Op cit*, Ref 86, Principle XII.

<sup>102</sup> *Op cit*, Ref 86, Principle XII.

<sup>103</sup> *Op cit*, Ref 1, sec 5657 (a) (2).

<sup>104</sup> *Op cit*, Ref 1, sec 5625 (c).

<sup>105</sup> *1991 EOS Reference Handbook*, NASA Goddard Space Flight Center, p 19. Since then, Dr Robert Price, Director of the Mission to Planet Earth Office, NASA Goddard Space Flight Center, Greenbelt, MD, has announced that the 'affiliated research user' concept has been replaced by a more liberal data policy. EOS policy is now to make data available to anyone, including 'high school teachers and graduate students', regardless of affiliation, for the cost of reproduction. *Pecora 12*, EROS Data Center, 25 August 1993. As EOS data policy is a constantly evolving process, however, this may not be a final determination.

<sup>106</sup> *Op cit*, Ref 1, sec 5613 (a) (1).

<sup>107</sup> *Op cit*, Ref 1, sec 5602 (14) (A), (B), and (C).

<sup>108</sup> *Op cit*, Ref 1, sec 5615 (a) (1).

<sup>109</sup> *Op cit*, Ref 1, sec 5615 (a) (6).

<sup>110</sup> *Report of the Secretary-General: Study on the Implications of Establishing an International Satellite Monitoring Agency*, UN Doc A/AC.206/14, 9, 6 August 1981.

<sup>111</sup> 'Landsat/Spot Merger Talks Spark Debate on Commercial Space Venture', *Aviation Week and Space Technology*, 23 January 1989, pp 20-21, col 1.

<sup>112</sup> *Op cit*, Ref 1, sec 5641 (a) (2).



France is influenced by the recasting of Landsat commercialization and follows its earlier inclination to stop subsidizing SPOT in its current form, then the concurrence of these events could create momentum toward establishing some form of an ISMA. A 'multinational partnership . . . involving both private and public sectors' has already been endorsed by Spot Image who 'would be happy to restart the discussions between the French and US.'<sup>116</sup>

#### *International partnerships and the merger of military and civilian management*

Related to the issue of establishing an ISMA-type organization is the issue of the appropriate relationship between civilian and military space activities. During the 1980s the legally required separation between US military and civilian space activities was greatly reduced.<sup>117</sup> The US and France have already agreed to cooperate in space-based military programmes and identified environmental monitoring as a possible area for cooperation.<sup>118</sup> Japan, an ally and potential ISMA partner, is legally prohibited from joining any activity that involves military participation,<sup>119</sup> while military participation raises the spectre of colonialism for developing nations. These factors, and the Policy Act's merger of civilian and military management of the Landsat system, raises the need to reconsider what ought to be the proper military/civilian relationship in remote-sensing activities. The Principles exclude military activity<sup>120</sup> and are, at this time, unavailable for directing their evolution although the space treaties that permit military participation in peaceful and scientific activities are relevant.<sup>121</sup>

#### **Remote-sensing leadership for the twenty-first century**

The Policy Act's long-term focus and added emphasis on environmental and public sector research suggests that the Act's goal of 'maintaining international leadership in satellite land remote sensing'<sup>122</sup> be reconceptualized. The global nature of remote sensing, its mixed public good and commercial value, the large number of remote-sensing participants, and the varied contributions of each participant, require a leadership model different from the ones utilized in Cold War adversarialism and 1980s commercialization. '[T]he norm in the postindustrial era will be for leadership relationships to have more than one leader . . . [where] leadership [is] a "communal relationship" . . . which is something larger than one leader and one follower.'<sup>123</sup>

In order to realize the Policy Act's promise a post-industrial age model of leadership that views remote-sensing activities as occurring within the whole global community and as part of an interconnected web of relationships among data users and providers is necessary. In large part the leadership role of the United States – or any nation – will be the outcome of successful interaction among all remote-sensing nations as well as scientific and technological advancements. Failure to

<sup>116</sup>Hearings, pp 313–316.

<sup>117</sup>M. Smith, 'Keep Military, Civil Space Separate', *Space News*, 11–17 January 1993, p 16.

<sup>118</sup>Two Space Powers Agree to Share Work', *Space News*, 15–31 January 1993, p 3.

<sup>119</sup>1969 Diet Resolutions with the establishment of the Space Activities Commission and NASDA.

<sup>120</sup>*Op cit*, Ref 89. The last clause in Principle I that defines the purpose of remote sensing was negotiated to exclude military activities. The Principles are limited to 'improving natural resources management, land use and the protection of the environment.'

<sup>121</sup>Treaty on Principles Governing the Acti-

elements necessary for vital US remote-sensing institutions that can direct the nation's remote-sensing future and positively influence international remote-sensing activities. At the same time, it lacks clarity and some important provisions, and this may defeat the new law's final success. Thus, the Policy Act's highest promise and worst problem stems from the same source: its ambiguity. Interpretation of the law's provisions will be necessary many times in the near and far future.

An important lesson for resolving the Policy Act's ambiguity in a productive and beneficial manner can be gained from a decade of experience with the Landsat Act. That law ultimately failed because of its narrow focus, short-term values, and lack of directed follow-through. Relevant as it is to the human condition, the global environment, and the global economy, remote sensing is, and will be, one of the most important technologies of the twentieth and twenty-first centuries. This time remote-sensing decisions must be made in favour of the greatest good, for the most people, for the long-term – our global community deserves no less.

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