THE TRW SATELLITE CONSTELLATION CLAIM
SOME SPACE LAW CONSIDERATIONS[1]

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THE TRW CLAIM

Few people involved in patent issues can be unaware of the unusual history of the TRW patent Claim. TRW asserts that its patent has in effect reserved to it the exclusive right to use the medium earth orbit, MEO, for mobile satellite communication systems. This would inhibit and prevent the development of competing MEO systems.

The question that arises is whether the United Stares Patent Office, PTO, can exercise its jurisdiction in a way that grants a monopoly over certain uses of the relevant part of outer space.

The TRW patent Claim relates to the provision of satellite-based communications between low-powered handsets with omni-directional antennae, using as a gateway a satellite forming part of a constellation. TRW claims that its patent is not limited to any individual element or step involved in the formation or the operation of the constellation of satellites. The Claim involves:

- Launch of a constellation of satellites to between 5,600 and 10,000 nautical miles above the earth;
- At least one satellite to have a reduced antenna field of view, FOV, less than full earth coverage;
- The satellites to be oriented in a plurality of predetermined orbital planes;
- Receiving radio frequency signals by at least one satellite from a plurality of mobile handsets with omni-directional antennae;
- Overlapping of a portion of the coverage region of a departing satellite with a portion of the coverage region of an arriving satellite;
- Pre-determined criteria for the assignment of calls to or from users within the coverage overlap region from a departing satellite to an arriving satellite (call hand-over).

Clearly, TRW could secure a patent in respect of implementation of some individual steps, if they are novel and unobvious. There is much prior art in relation to many of these elements.

But TRW asserts that the use of the MEO for mobile satellite communications requires that the system have all the characteristics outlined in the Claim. An essential element of the TRW patent is the location of the satellite constellation at MEO of between 5,600 and 10,000 nautical miles. The attraction of the MEO is the reduced number of (admittedly more powerful) satellites necessary for global communications. The patent granted to TRW is in reality a narrow one for a particular use of the MEO. However, TRW asserts that it has achieved its broader objective.

UNITED STATES PATENT LAW EXTENSION TO OBJECTS IN OUTER SPACE

The United States amended its patent legislation in 1990 to extend its jurisdiction to objects in outer space. Acts on a "space object or component thereof under the jurisdiction or control of the United States" are treated as taking place within the United States.

Under this part of the legislation it is necessary to show an act on a specific space object, such as a satellite or the Space Shuttle that is carried on the registry of the United States. An example of such an

[1] Originally published at http:www.interesting-people.org/archives/interesting-people/199509/msg00106.html

act would be carrying out a patented manufacturing process within the Shuttle. However, the legislation does not purport to and does not have the effect of extending the patent jurisdiction of the United States to any part of outer space *per se*, merely to the space object itself.

United States Patent Infringement Provisions

Even prior to 1990, United States patent legislation provided that in some circumstances, a person arranging for implementation outside the territory or jurisdiction of the United States, of certain actions specified in a US patent, that person is infringing the US patent.

Even though the relevant actions take place outside the United States, infringement is deemed to occur inside the United States. It is therefore arguable that if the satellites for an MEO system are made in the United States, but the launch takes place elsewhere, the provider of the satellites has infringed the TRW patent in the United States. An attempt by someone other than TRW to circumvent the patent by launching a US-made cluster of satellites from another country would fail under these provisions.

IMPLICATIONS OF THE TRW CLAIM

Communications is still the most significant activity in outer space. Mobile satellite communications is growing in significance more rapidly than any other single use of outer space. Even at this early stage of the game there are three systems designed for operation in MEO and 13 systems intending to use LEO. There are certain technical and economic features that make MEO systems more desirable [See "Big and Small", Aerospace America, September 1995].

If the grant has the effect claimed by TRW, the PTO has made the MEO substantially unavailable for use by any other entity. To the extent that most of the capital and the satellites for such systems will originate in the United States, the TRW patent would preclude MEO use by the majority of other countries that might desire to establish MEO systems.

INTERNATIONAL LAW OF OUTER SPACE

The United States is Party to the Outer Space Treaty 1967, OST. Two fundamental principles of Outer Space Law are:

"Outer space, including the moon and other celestial bodies, shall be free for ... use by all States without discrimination of any kind ... ", and

that "Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claims of sovereignty, by means of use or occupation, or by any other means".

If the TRW assertion is correct, by its grant the PTO has appropriated to the United States' patent sovereignty a part of outer space, in breach of the United States' obligations under the OST. Such an exercise of sovereignty by the PTO is clearly beyond what the United States recognizes as the limits of its patent jurisdiction, as permitted under the OST, and evidenced in the 1990 amendment.

Furthermore, the TRW patent would de facto preclude other States from free use of a part of outer space, contrary to the OST. This also contravenes the principle that "the ... use of outer space ... shall be the province of all mankind".

CONCLUSION

This is a much-abbreviated argument based on the international law obligations of the United States and its impact on patents relating to the use of parts of the outer space. Nevertheless, it should be apparent that there are serious issues that need to be addressed. If the PTO grant has the effect asserted by TRW, then the PTO has exceeded its jurisdiction in granting the Claim of TRW as it relates to the MEO.