

Foreign Competition in the Remote Sensing Satellite Industry



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What are we going to do?

- ❖ Who are major competitors in operating significant high resolution remote sensing satellites?
- ❖ What kinds of satellites? How many?
- ❖ Government support for or role in the satellite programs?
- ❖ Regulation of commercial distribution of imagery & imagery products?



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Canada

- ❖ RadarSat-1 (1999) MacDonald Dettwiler Associates & Canadian Space Agency
- ❖ RadarSat-2 (2007) MDA & CSA
- ❖ CSA 80% funding RadarSat-1; major funding for RadarSat-2
- ❖ MDA markets imagery
- ❖ Canadian Gov't regulates data distribution by customer



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France

- ❖ SPOT series - 2, 4, 5 currently operational (E-O)
- ❖ SPOT Image - partnership among CNES, IGN, & private industry; Belgium & Sweden partners
- ❖ ORFEO consortium with Italy
- ❖ Pleiades - 2 E-O 0.7m satellites 2009; Austria, Belgium, Spain, Sweden partners
- ❖ SPOT Image - EADS now holds 81%
- ❖ French Gov't oversight of imagery distribution



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Germany

- ❖ SARLupe – 5 satellite constellation; national reconnaissance, no commercial; OHB Systems
- ❖ TerraSAR-X – Tandem & add'l planned; joint program Ministry of Ed. & Sci., DLR, & EADS Astrium
- ❖ Imagery marketed by Info-Terra (EADS Astrium)
- ❖ RapidEye – 5 satellite constellation, all commercial
- ❖ Satellite Data Security Law – BAFA case-by-case review



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Israel

- ❖ Ofek - national reconnaissance system (E-O)
- ❖ EROS A1 & B - civil/commercial, (E-O), ImageSat International owns, operates, & distributes imagery
- ❖ TECSAR - national reconnaissance & SAR technology demonstration - imagery distributed commercially



Italy

- ❖ COSMO-SkyMed 4 satellite constellation (SAR);
Italian contribution to ORFEO
- ❖ COSMO-SkyMed joint program among Ministry of Defense; Ministry of Education, Universities, & Science; ASI (Italian Space Agency)
- ❖ Imagery distributed commercially by e-geos
(Telespazio - ASI consortium)



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India

- ❖ Complete space program; national reconnaissance & civil/scientific systems
- ❖ Indian Space Research Organization (ISRO) - Antrix Corp. commercial arm
- ❖ Operating 7 high resolution E-O systems; RISAT (SAR) scheduled 2009
- ❖ Antrix distributed imagery commercially - foreign internally & domestic externally



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Russia

- ❖ Resurgent national space & satellite program
- ❖ Resurs DK1 (2006) E-O civil satellite
- ❖ SOVZOND JSC private firm (1992) commercial imagery distribution (Resurs DK1 & other)
- ❖ SMOTR - Gazkom owned/operated 4 satellite constellation (2 SAR, 2 E-O) monitor oil & gas pipeline network



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South Korea

- ❖ Korean Aerospace Research Institute (KARI)
- ❖ KOMPSAT-1 & 2 operating (E-O)
- ❖ Arirang-5 (SAR) scheduled 4th Q 2008
- ❖ Arirang-3 & 3A 0.7m E-O satellites scheduled 2009 & 2012
- ❖ Imagery marketed commercially thru foreign firms (e.g., SPOT Image)



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Taiwan

- ❖ National Space Organization (NSPO) owns/operates Taiwan's satellites
- ❖ RocSat-2 (E-O) - commercial imagery distribution by SPOT Image
- ❖ Argo - SSTL clone to supplement RapidEye constellation



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Japan

- ❖ Advanced Land Observing Satellite (ALOS) JAXA civil/scientific (E-O)
- ❖ ALOS imagery distributed commercially by Remote Sensing Technology Center of Japan
- ❖ Information Gathering Satellites - national reconnaissance, 3 E-O & 2 SAR satellites



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China

- ❖ Complete space program; systems for national reconnaissance, civil, & scientific purposes
- ❖ Small Multi-Mission Satellites - 2 E-O operating, 1 SAR 2009
- ❖ China-Brazil Earth Resources Satellites (CBERS) - 2 operating, 2 planned; all E-O
- ❖ No substantial role in commercial imagery market



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U.K.

- ❖ No commercial distribution of remote sensing satellite imagery - Gov't civil programs
- ❖ Surrey Satellite Technology Ltd. (SSTL)
- ❖ High resolution E-O micro-satellites for foreign civil programs
- ❖ Technology transfer vs. COTS methodologies



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Themes

- ❖ Shared national reconnaissance/civil systems vs. separate programs
- ❖ Government-private partnerships vs. separate government & private programs
- ❖ SAR vs. E-O; other spectra
- ❖ How governments regulate imagery distribution - by operation, different forms of case-by-case



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