

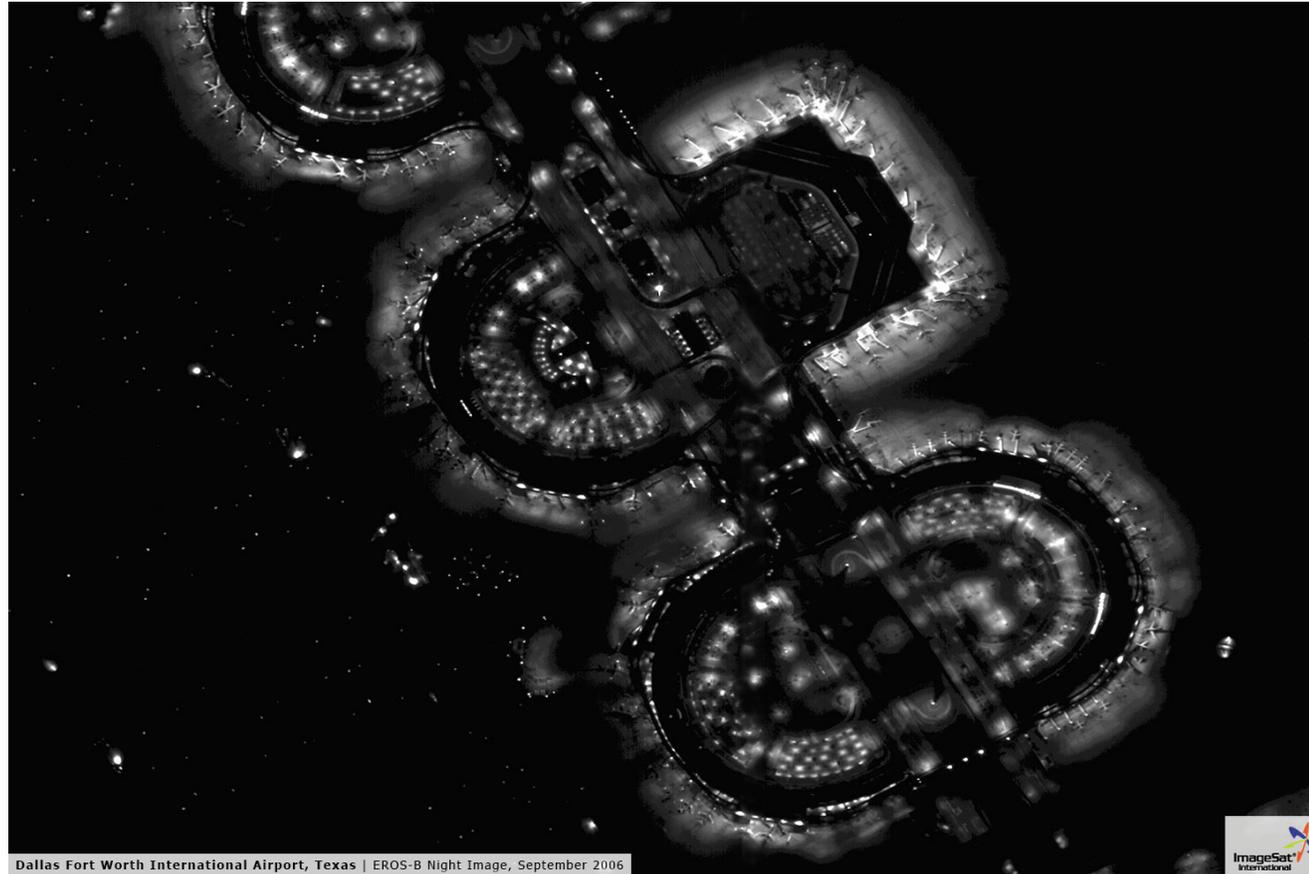
Task Group 2: NTI and NEI Guidelines

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Our charge

- Review new restrictions on night-time imaging (NTI)
- Review guidelines to relax historical restrictions on non-Earth imaging (NEI)
- Provide feedback on the potential impact of both to industry operations and business models
- Report focuses largely on NEI
 - Classified NTI discussions are on-going among cleared stakeholders

NTI Example



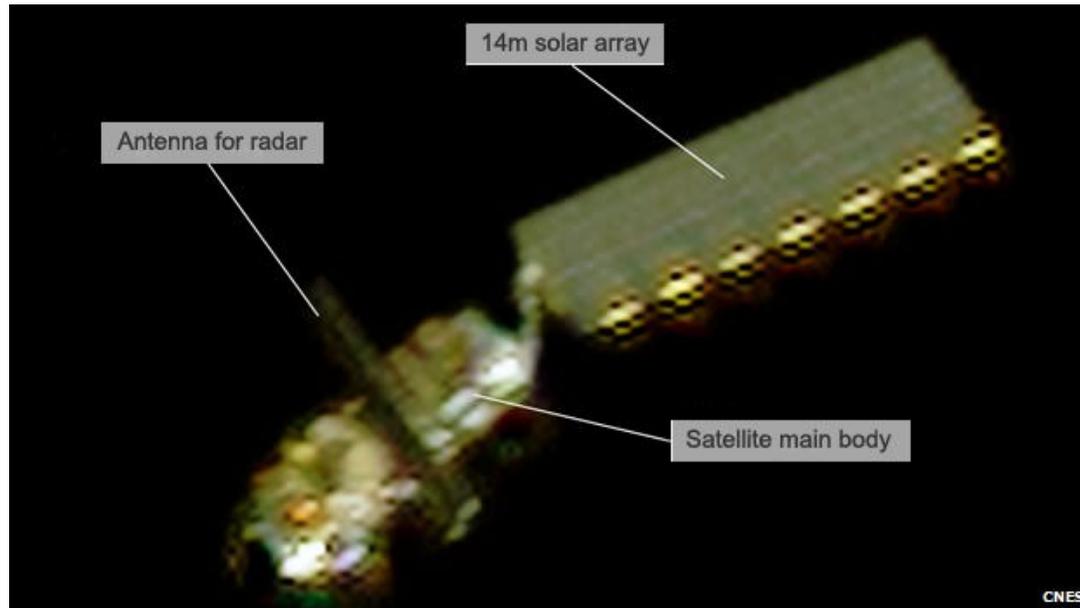
Night-time satellite image of DFW airport taken by French EROS-B satellite (0.7-m resolution).

Source: <https://innoter.com/products/1528?language=en>

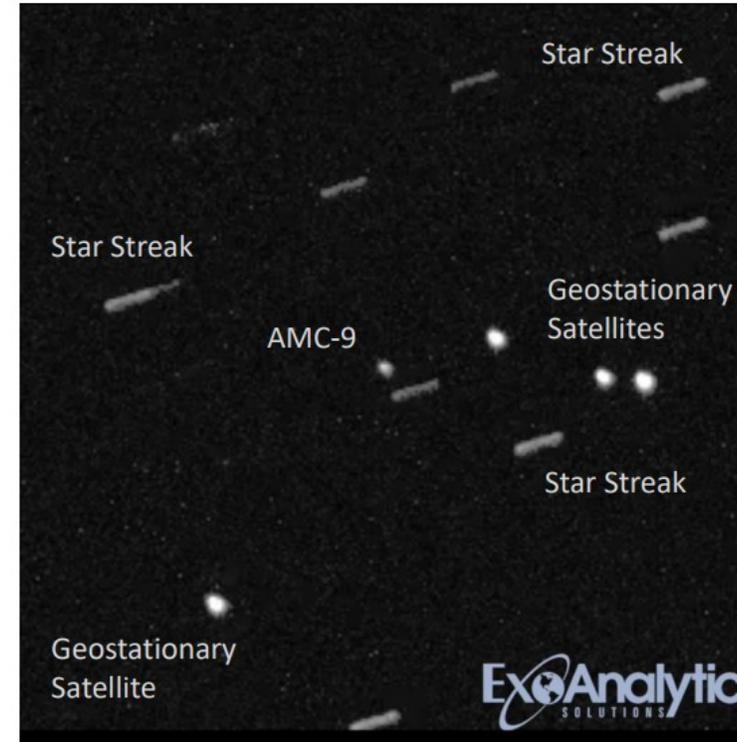
NEI Guidelines

- Consenting imaging operations
 - No limit to resolution
 - Must have **written permission** from sensed object's owner/operator/government
 - Must provide **90-day prior notice** to USG before operations
- Non-consenting imaging operations
 - Limited to **3x3 pixel** (roughly less than 0.5 meter resolution)
 - Cannot **disseminate tracking data on uncorrelated objects** w/out NOAA permission (or stripping metadata?)
 - Must **purge uncorrelated data** from systems

NEI Examples



ESA Envisat satellite imaged by French Pleiades satellite from a distance of 100 km.
Source: <https://www.universetoday.com/94744/esas-ailing-envisat-imaged-by-another-earth-orbiting-satellite/>



AMC-9 satellite non-resolved image from ground-based telescope.
Source: <https://arstechnica.com/science/2017/07/a-large-satellite-appears-to-be-falling-apart-in-geostationary-orbit/>

Findings - NEI

- Time-delay restriction would severely restrict commercial NEI from contributing to real-time events or resolving catalog errors
 - Newly-launched objects
 - Breakups and collisions
 - Anomaly resolution
 - Finding cross-tagged, lost, or uncataloged objects
 - Scientific research on space debris
- Prior consent cannot be obtained for vast majority of space objects
 - Only small percentage have been placed on a National Registry
 - 90+% of space objects larger than 1 cm are not in Space Track catalog
- Restrictions would limit value of commercial data to contribute to transparency & enforcement of norms

Findings – NEI (con't)

- Significant negative impact on competitiveness
 - Ground-based commercial sensors can provide similar unresolved data, and have no licensing requirements/restrictions
 - Foreign systems can already provide NEI capabilities
 - Restrictions will hinder development of new capabilities such as on-orbit servicing and inspections that rely on NEI
- Significant impact on business models/ops
 - Restrictions largely eliminate anomaly resolution from business models, which is likely to be most profitable
 - Significant costs to create systems/processes to filter all data & delete uncorrelated
 - Stripping metadata removes much of the commercial value of the data

Recommendations

- “Shutter control” used in very specific time/place, with high level approval, will have least impact on commercial industry
- If licensing restrictions are required, alternatives:
 - Prior USG approval of each operator’s CONOPS, instead of each individual operation
 - Allow operators to retain all data, and only filter when disseminated/distributed
 - Prior consent should be waived for space objects identified as space debris or rocket bodies