Commercialization & Corporatization of GNSS Service Providers

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Background

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Education: LLB, Shandong University; LLM, Beihang University;
PhD, Leiden University, the Netherlands

LLM Thesis: Legal Study on the Possessory Lien over Civil Aircraft
## I. Background

### Commercialization
- Introducing GNSS Service into the commercial Market
- **Service Access**
  - unpaid → paid
  - sustainable development
  - profitable or non-profitable but with a cost recovery mechanism

### Corporatization
- Turning an organization from an authority to a company
- **Operation Structure**
  - independent legal entity
  - efficiency & liability
  - private or State-owned company

### Privitization
- Transferring an entity from public sector to private sector
- **Ownership**
  - private stakeholders
  - decrease burden of government

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**GNSS Upstream Sectors**
I. Background

Privatization and Commercialization of GPS

Aron Pinker and Jim Hasik

Abstract: The DOD is considering the potential for privatization of various sectors of its activity. It has been estimated that savings from 20 to 27 percent can accrue from privatization, primarily from cuts in personnel. The purpose of this paper is to analyze the concept "privatization" (with respect to GPS), analyze the pros and cons for the privatization of the GPS, and make a recommendation on the future status of the GPS. Our approach is to analyze the meaning and implication of various levels of privatization of GPS. We use the working hypothesis that privatizing a DOD activity would mean aligning the government with the standard services or items offered to any customer. Privatizing a DOD enterprise would mean selling it to private owners, or fully disposing of it and its obligations, and becoming a regular customer of this privatized enterprise. The US government has made a substantial investment in the GPS. Naturally, any thought of privatization would have to address the recouping of the investment, of the maintenance costs, or making some substantial contribution towards these costs. Our analysis, therefore, deals with three levels of privatization or ceding of control: complete, partial, and commercialization. We consider the the advantages and disadvantages for each case.

Published in: Proceedings of the 9th International Technical Meeting of the Satellite Division of The Institute of Navigation ION GPS

September 17 - 20, 1996
Kansas City, MO

Pages: 1501 - 1509


Full Paper: Sign In

Has the U.S. Government Thought About Privatizing GPS?

There are no plans to privatize GPS. U.S. law and policy require the civil GPS service to be provided free of direct user fees.

Learn About the Law

Learn About U.S. Policy
II. Demand

- Military Needs
  - ≈1960s

- Civil Use
  - After 1983

DUAL USE
II. Demand

Department of Defence

world's largest military satellite constellation

National Security First

U.S. Organizational Structure for GPS Governance

WHITE HOUSE

NATIONAL EXECUTIVE COMMITTEE FOR SPACE-BASED PNT

Executive Steering Group
Co-Chairs: Defense, Transportation

ADVISORY BOARD
Sponsor: NASA

NATIONAL COORDINATION OFFICE
Host: Commerce

Civil GPS Service Interface Committee
Chair: Transportation
Deputy Chair: Coast Guard

GPS International Working Group
Chair: State

Engineering Forum
Co-Chairs: Defense, Transportation

Ad Hoc Working Groups
II. Demand

Communication, Navigation and Surveillance/Air Traffic Management (1980s - Present)

initial expectation
- civil & international GNSS
- failed due to high cost

negative factor:
- high cost for the infrastructure update
- military nature of main GNSS, without control
II. Demand

Political Commitment
on the availability of GPS service
1994+2007

• concern & untrust remains
• decrease military factors in the provision of civil service

corporatization of GNSS service providers

provision of GNSS civil signals
II. Demand

Financial Pressure

Reasons:
- High cost for the development, maintenance & operation
- Free-of-charge policy vs satellite communication market

Examples:
- failure of Galileo PPP model
- maintenance of GLONASS around 2000s
- the cost of GPS Modernization (civil signals)
  - from DoD to DOT

Commercialization of GNSS service

Cost recovery mechanism
II. Demand

GNSS - Cost Allocation

Introduction

The Worldwide CNS/ATM Systems Implementation Conference (Rio de Janeiro, 1998) called on ICAO to address the issue of cost allocation amongst all users of Global Navigation Satellite System (GNSS), including its allocation between civil aviation and other user categories. Since then, a Secretariat study on the matter has been considered by various forums.

Provisional Policy Guidance

In February 2007, the following five conclusions of the study were accepted by the Council as “provisional” policy guidance on the allocation of the incremental costs of more advanced GNSS services:
II. Demand

- **Basic GNSS services** will be free as a common good
- **Advanced GNSS services**, requiring higher quality with higher cost, will have to be paid

Cost for more advanced GNSS services shall be allocated amongst all users categorizes.

Cost allocation policy should be consistent with ICAO’s policies on air navigation services charges.

Cost recovery mechanism in civil aviation shall be through transparent negotiations between a GNSS service provider and aviation representatives as well as other users.

- Allocate cost among ANSP and on different phases of flight
- ANSP may recover the cost from the airspace users within their existing charging systems

NO REJECTION on GNSS cost allocation
II. Demand

Once a consensus has been reached on the definition of basic services and liabilities of GNSS service providers, this provisional guidance is to be redrafted with appropriate wording for inclusion in ICAO’s Policies on Charges for Airports and Air Navigation Services (Doc 9082).
## II. Demand

The technical, institutional and legal evolution of CNS/ATM systems under the ICAO Regime

<table>
<thead>
<tr>
<th>Year</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>The ICAO Council established the FANS Committee.</td>
</tr>
</tbody>
</table>
| 1988 | 1. The FANS Committee developed the concept of CNS/ATM systems.  
2. The ICAO Legal Committee started to work on the legal aspects of CNS/ATM systems with a focus on GNSS.  
3. The priority of legal aspects of CNS/ATM systems became Item 4. |
| 1989 | The FANS Phase II was established. |
2. The 10th Air Navigation Conference requested the initiation of an agreement between the ICAO and GNSS-provider States concerning quality and duration of GNSS. |
| 1992 | 1. The concept of CNS/ATM systems was endorsed at the 29th Session of the ICAO Assembly.  
2. The priority of legal aspects of CNS/ATM systems moved to Item 5 and further to Item 1.  
3. The 29th Session of the ICAO Legal Committee made preliminary conclusions on no inconsistency between the Chicago Convention and the implementation of the concept of CNS/ATM systems. |
| 1994 | 1. The ICAO Council released the ‘Statement of Policy on CNS/ATM Systems Implementation and Operation’ for the implementation of CNS/ATM systems including GNSS.  
2. The 29th Session of the ICAO Legal Committee:  
   (1) prepared the Draft Agreement Between the International Civil Aviation Organization (ICAO) and GNSS Signal Provider Regarding the Provision of Signals for GNSS Services;  
   (2) recommended establishing the LTPEP using a two-stage approach, namely, identifying a suitable solution for the immediate future, and a legal framework for the long-term future.  
3. The US government and ICAO exchanged letters on the use of GPS in civil aviation. |
| 1995 | 1. The 31st ICAO Assembly adopted Resolution A31-7 which requests the Council to establish the LTPEP.  
2. The LTPEP was established by the ICAO Council. |
| 1996 | The Russian Federation and ICAO exchanged letters on the use of GLONASS in civil aviation. |
2. The World-wide CNS/ATM Systems Implementation Conference (Rio de Janeiro) gave recommendations to legal action for CNS/ATM systems.  
3. The 32nd ICAO Assembly:  
   (1) adopted Resolution A32-19 ‘Charter on the Rights and Obligations of States Relating to GNSS Service’ which was followed by a number of Recommendations offered by the LTPEP on those subjects which need to be further studied before a consensus was reached;  
   (2) adopted Resolution A32-28 ‘Development and elaboration of an appropriate long-term legal framework to govern the implementation of GNSS’, which instructed the ICAO Council to establish a Secretariat Study Group on Legal Aspects of CNS/ATM Systems.  
4. The ICAO Council established the Secretariat Study Group ‘Development and Elaboration of an appropriate long-term legal framework to govern the implementation of GNSS’;  
5. The Secretariat Study Group submitted its report, and the Group received approval on its accomplishing its mission at the 35th ICAO Assembly. |
| 2001 | The first package of SARPs was introduced in Volume 1 (Radio Navigation Aids) of Annex 10 (Aeronautical Telecommunications) to the Chicago Convention. |
| 2003 | The 11th Air Navigation Conference recommended a worldwide transition to CNS/ATM systems. |
| 2004 | The Secretariat Study Group submitted its report, and the Group received approval on its accomplishing its mission at the 35th ICAO Assembly. |
| 2005 | 1. The priority of legal aspects of CNS/ATM systems moved to Item 3.  
2. The first edition of the GNSS Manual was released. |
2. The US government and ICAO updated their exchanges of letters on the use of GPS in civil aviation. |
| 2012 | The 12th Air Navigation Conference addressed issues of use of multiple constellations and GNSS vulnerabilities. |
2. The second edition of the GNSS Manual was released.  
3. The priority of legal aspects of CNS/ATM systems moved to Item 3. |
| 2014 | The priority of legal aspects of CNS/ATM systems moved to Item 5. |
| 2015 | The priority of legal aspects of CNS/ATM systems moved to Item 4. |
| 2016 | The fifth edition of the Global Air Navigation Plan was released. |
| 2017 | The third edition of the GNSS Manual was released. |
| 2018 | The 13th Air Navigation Conference will pave the way forward to a more cost-efficient manner on the use of GNSS in civil aviation. |
II. Demand

The Principle of State Sovereignty

- no compensation for victims
- decrease confidence on the use of GNSS
- delay the move of CNS/ATM

- irresponsible image
- decrease reputation
- slow international promotion on GNSS application, e.g. new GNSS players

GNSS User States

GNSS civil Liability

GNSS Provider States

Commercialization and Corporatization of GNSS service Providers
### III. Experience & Practices

<table>
<thead>
<tr>
<th>Year</th>
<th>Organization</th>
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<tbody>
<tr>
<td>2001</td>
<td>Intelsat S.A.</td>
</tr>
<tr>
<td>2001</td>
<td>Eutelsat S.A.</td>
</tr>
<tr>
<td>2001</td>
<td>EUTELSAT IGO</td>
</tr>
<tr>
<td>1999</td>
<td>INMARSAT Ltd</td>
</tr>
</tbody>
</table>

**IGO**
- **privatization**
- **corporatization**
- **commercialization**

**IGO**

**International Company**
### III. Experience & Practices

#### Separation between ATC Governance and ATC Service

**State-owned or State-controlled company**

<table>
<thead>
<tr>
<th>Similarities</th>
<th>Differences</th>
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</thead>
<tbody>
<tr>
<td>• basic infrastructure relative with public safety</td>
<td>• civil ATC system + military national defense system</td>
</tr>
<tr>
<td>• State controlled system, not international control</td>
<td>• interest of civil users</td>
</tr>
<tr>
<td>• public service vs profit-seeking business</td>
<td>• most of GNSS = civil system + military system</td>
</tr>
<tr>
<td></td>
<td>• interest of national security first</td>
</tr>
<tr>
<td></td>
<td>• charging system vs unpaid policy</td>
</tr>
</tbody>
</table>

**Partial Reference**
III. Experience & Practices

- transferred Safety of Life Service to EGNOS
- reconstructed Commercial Service to High Accuracy Service
  - additional navigation signal with high accuracy: free of charge
  - value-added service (authentication): fees-based
  - encrypted signal with controlled access: lie down possibility for charging system
The European Geostationary Navigation Overlay Service (EGNOS) consists of three core services:

- **Open Service**: free and open to the public, the Open Service is used by mass-market receivers and common user applications;
- **EGNOS Data Access Service (EDAS)**: offered on a controlled access basis (i.e. via the internet and mobile phones) for customers requiring enhanced performance for professional use;
- **Safety of Life Service (SoL)**: for safety-critical transport applications, including civil aviation, which require enhanced and guaranteed performance and an integrity warning system.

The EGNOS service area includes all European Member States.
III. Experience & Practices

Our shareholders are 7 key European Air Navigation Service Providers ANSPs.

THE ESSP IN BRIEF

We are an experienced and dynamic company specialized in the operations and provision of satellite-based services for aviation.

Our core activities are the operation of the EGNOS Overlay Service. Operation & Service Provision

EGNOS is a satellite based augmentation system which delivers precise satellite positioning on top of GPS to make it suitable for safety critical applications such as landing aircrafts or navigating ships through narrow channels.

The EGNOS Service Provision contract is funded by the European Union and managed through the European Global Navigation Satellite Systems (GNSS) Agency (GSA), with a clear mandate to help foster the use of satellite navigation within Europe and particularly in the domain of aviation. As such, we manage the second largest contract in space by the European Commission.

In addition to the provision of EGNOS Services, ESSP expertise allows us to deliver new activities and projects in the fields of:

- Consultancy Services for aviation (PBN implementation; SBAS operations, certification and service provision)
- Provision of pan-European certified services for aviation
- Provision of global, satellite-based Communication, Navigation and Surveillance (CNS) services for aviation
III. Experience & Practices

- **EGNOS**
  - Working Agreement vs License
    - Quality Commitment
    - Service Contents
    - Liability Terms
IV. Proposals

**EGNOS**

- **Corporatization**
  - Owner-EU
  - Operator-ESSP
  - Supervisor-EC-GSA
  - Contractor: GSA & ESSP
  - Service Provider-ESSP
  - Main User-ANSP

**Civil Augmented System VS Dual-Use Basic System**

**Most of Core GNSS**

- Operator-DOD
- Service Provider-DOD

Partial Reference
IV. Proposals

Corporatization of GNSS Service Providers

interest of national security
- only civil service
- no change on military service, no privatization

key role of public authority
- public nature, public funds
- high cost of development and operation, EGNOS fund from the EU
- only corporatization, as not profitable, no privatization

model contract
- instead of license
- contractual chain
- liability terms
- charging policy

Supervision & Regulation
Operation & Maintenance
Research & Development
Finance & Fund

Civil Service
[contract: authorisation + cost recovery]

Authorised Service

Provider Corporate

Civil Users

State Government Public Authority
[license]

Military Service
[contract (clauses on civil liability + charging policy)]
Basic GNSS services will be provided free of charge as a common good to a multiple number of user categories, while more advanced GNSS services (including augmentation services) requiring a higher quality of service and hence higher costs will have to be paid for by all their users in most cases.

ICAO does NOT object GNSS Cost Allocation & Recovery Mechanisms.

higher fees means higher responsibility
free of charge does NOT free civil liability
IV. Proposals

Let's Work Together!

United Nations Office for Outer Space Affairs

International Committee on Global Navigation Satellite Systems

[Logos and flags of various organizations]

WG1  WG2  WG3  WG4

WG5 Policy & Law?
THANKS!