Why Trimble Supports GPS Modernization

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Modernized GPS:
A platform for innovation

- System Stability
- Operational excellence
- Open, well defined signals
- One example of where modernization can take us

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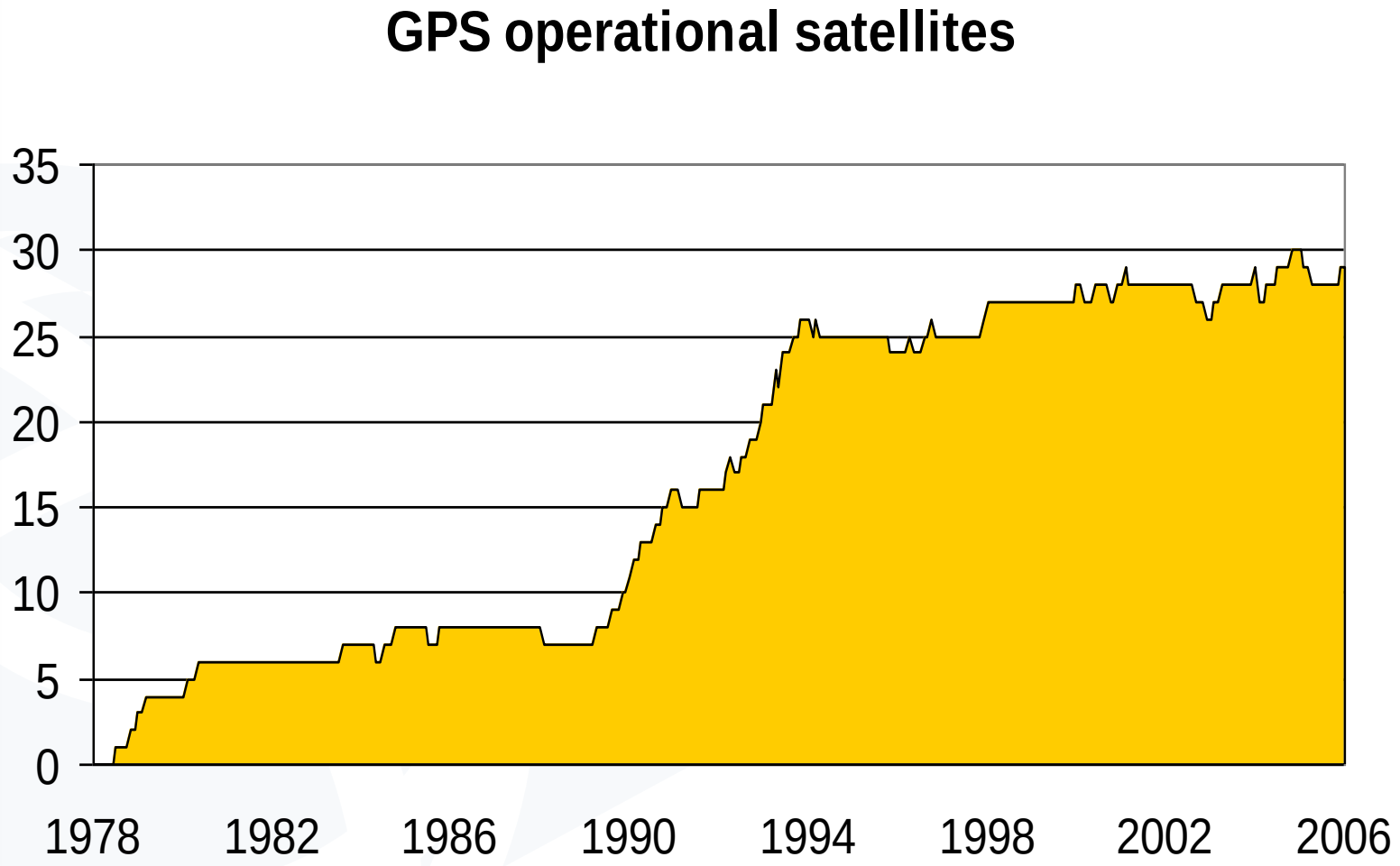
System Stability



Operational Excellence

Table 3-4. Service Reliability Standard

Service Reliability Standard	Conditions and Constraints
≥ 99.94% global average	• 30-meter Not-to-Exceed (NTE) SPS SIS URE. • Standard based on a measurement interval of one year; average of daily values within the service volume. • Standard based on 3 service failures per year, lasting no more than 6 hours each.
≥ 99.79% worst case single point average	• 30-meter NTE SPS SIS URE. • Standard based on a measurement interval of one year; average of daily values from the worst-case point within the service volume. • Standard based on 3 service failures per year, lasting no more than 6 hours each.

- **Specs from GPS Standard Positioning Service Performance Standard 2001**
- **This and the other established standards have been met every year since**

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8 month 2005 GPS anomaly list from USAF Space command

Anomaly Summary

- **SVN37 (PRN7): 3 Apr – Load-shed**
- **SVN31 (PRN31): 14 Apr – Baseband reset**
- **SVN27 (PRN27): 14 May – Rubidium #1 runoff leads to clock swap**
- **SVN26 (PRN26): 9 Jun – Rubidium #1 clock jump**
- **SVN15 (PRN15): 22 Jun – Comparator Reference Value Change**
- **SVN32 (PRN1): 24 Jul – Load-shed**
- **SVN26 (PRN26): 21 Aug – Crypto Variable Upload**

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Open, well defined signals

- **Well-defined signals make a platform for innovation**
  - **Interface control documents have been widely available throughout the history of GPS**
- **Raw signals from space rather than prepackage applications enable innovation**
  - **Nobody had thought of RTK when the system was designed, yet here we are with centimeter performance**

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Example of innovation driven by modernization

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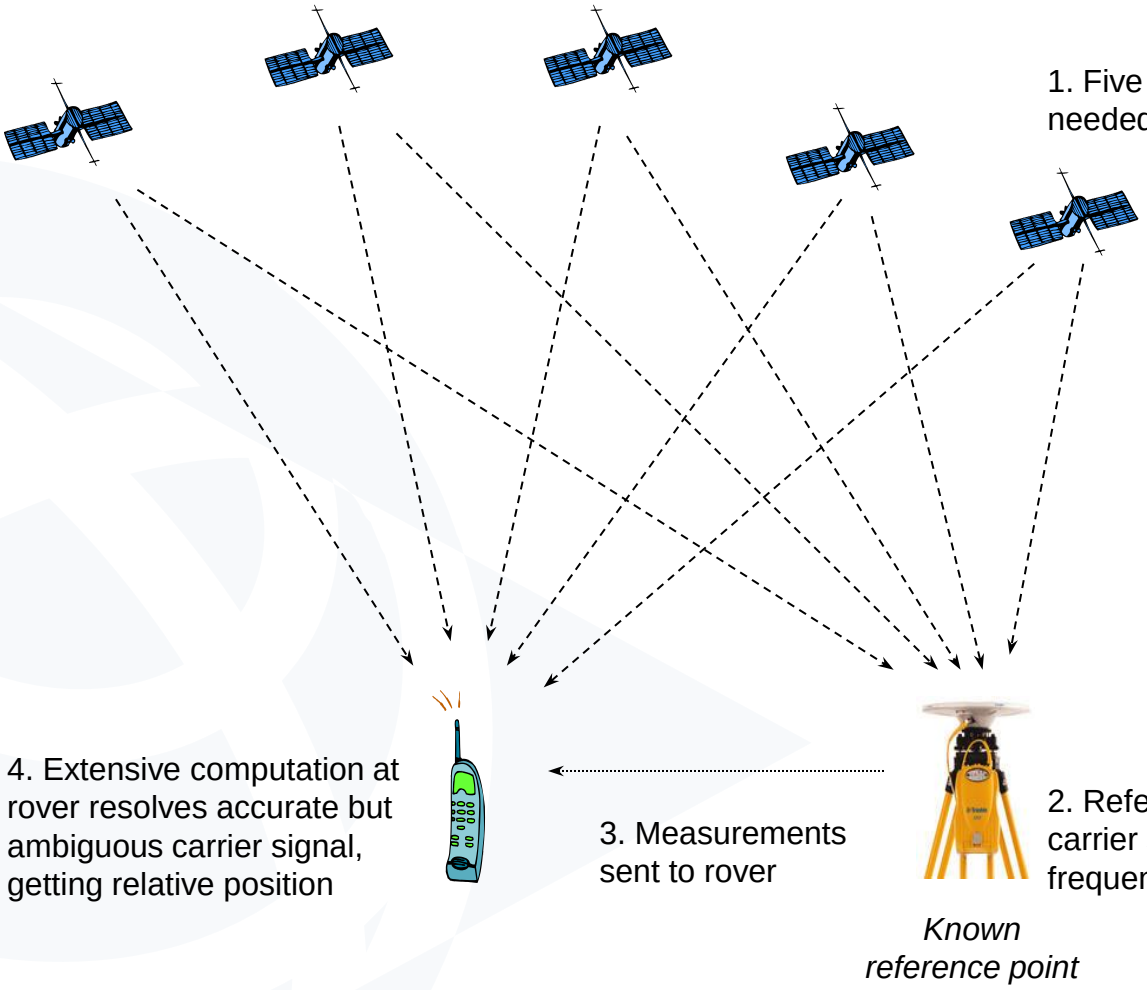
Real time kinematic trades simplicity for accuracy



High accuracy from GPS is widely used in industry

- RTK initialization or re-initialization can take up to 30 seconds
- It is impossible to hide this from the user
  - Not a problem for high value applications, like farming and construction
- High accuracy for general use depend on simplicity
  - Lower prices will follow

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GPS Modernization can make precise location ubiquitous

- 3 frequencies will dramatically reduce the initialization/ re-initialization time
- Combined with wireless corrections, the underlying complexity can be hidden from the user
- Accuracy and simplicity will go hand-in-hand

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Modernized GPS:
A platform for innovation

- System Stability
- Operational excellence
- Open, well defined signals
- Innovation will deliver more uses that are not yet foreseen

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