

The German GALileo Test and Development Environment (GATE)



Outline

- **Basic Information & Background**
- **GATE (Development) Consortium**
- **Test Area**
- **Technology / Test Modes**
- **Outlook**



Basics

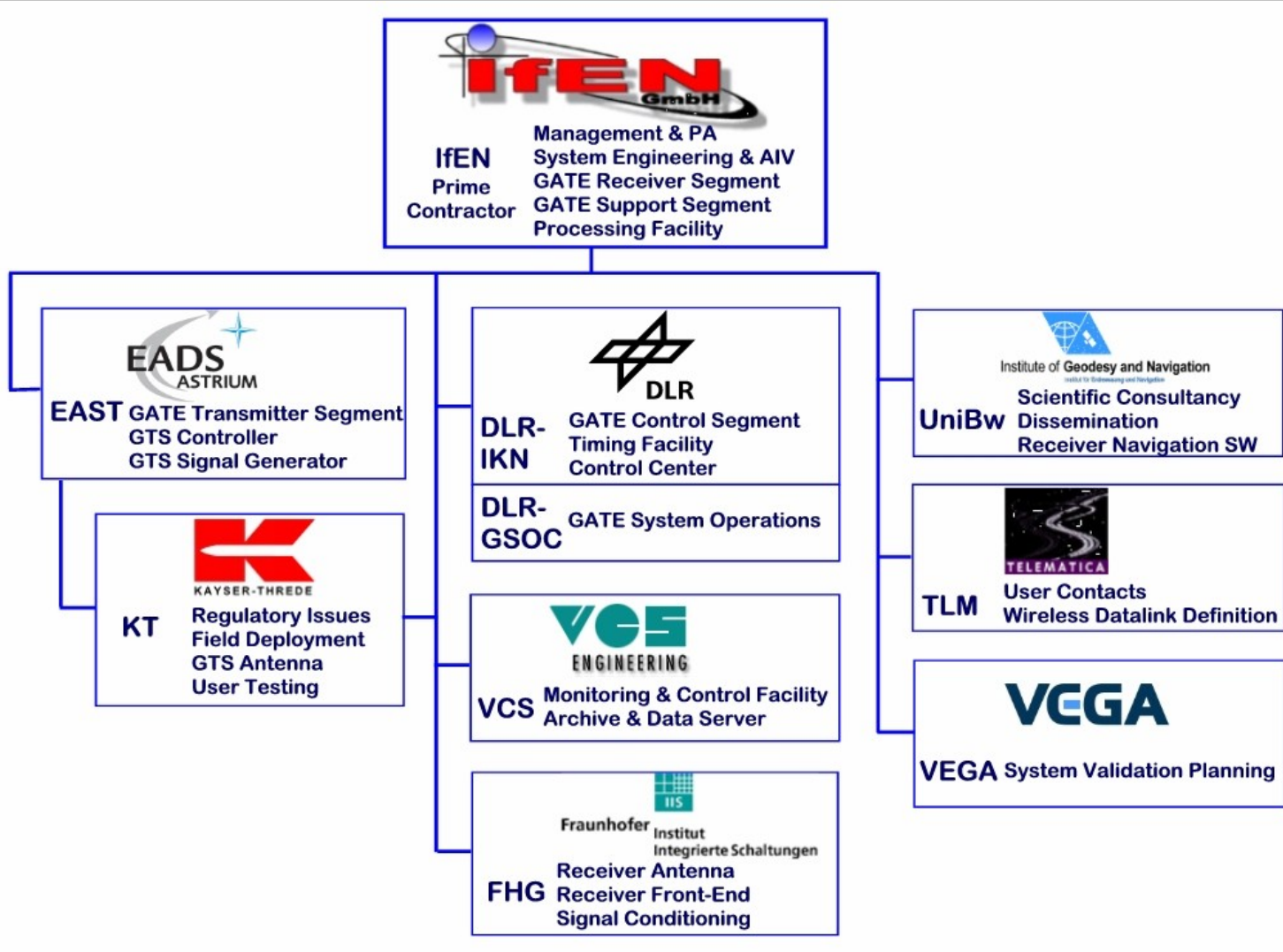
- **Galileo outdoor testbed in Germany**
- **Operation after midyear 2006, till 2010**
- **Financed by the German Federal Ministry of Education and Science (BMBWF) / German Space Agency (DLR)**

- **Support the GALILEO system development**
- **Support the GALILEO receiver development**
- **Support the GALILEO application development**

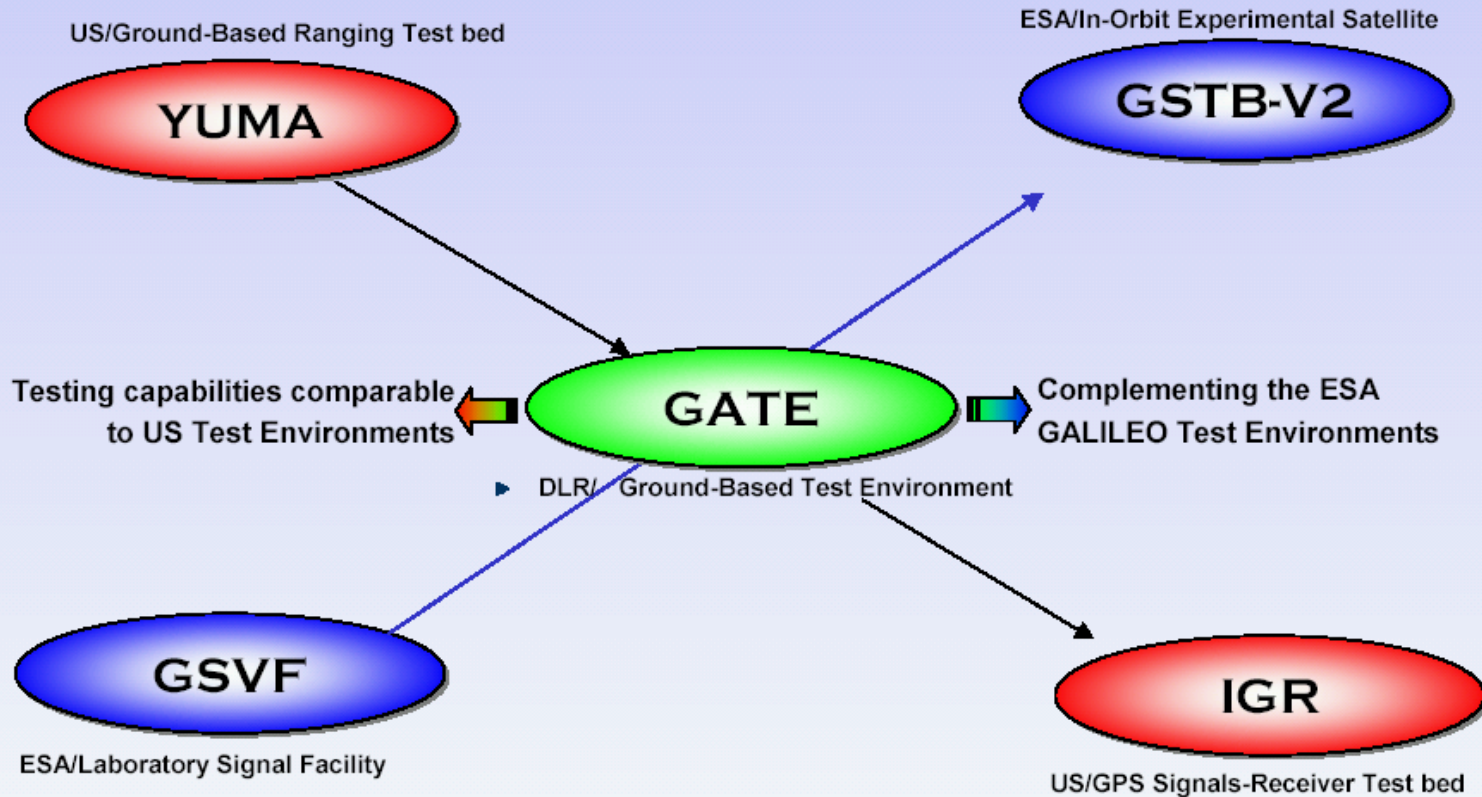
- **Six terrestrial Galileo signal transmitters placed on mountains**
- **Coverage area of $\sim 65 \text{ km}^2$**
- **Core test area of $\sim 25 \text{ km}^2$**



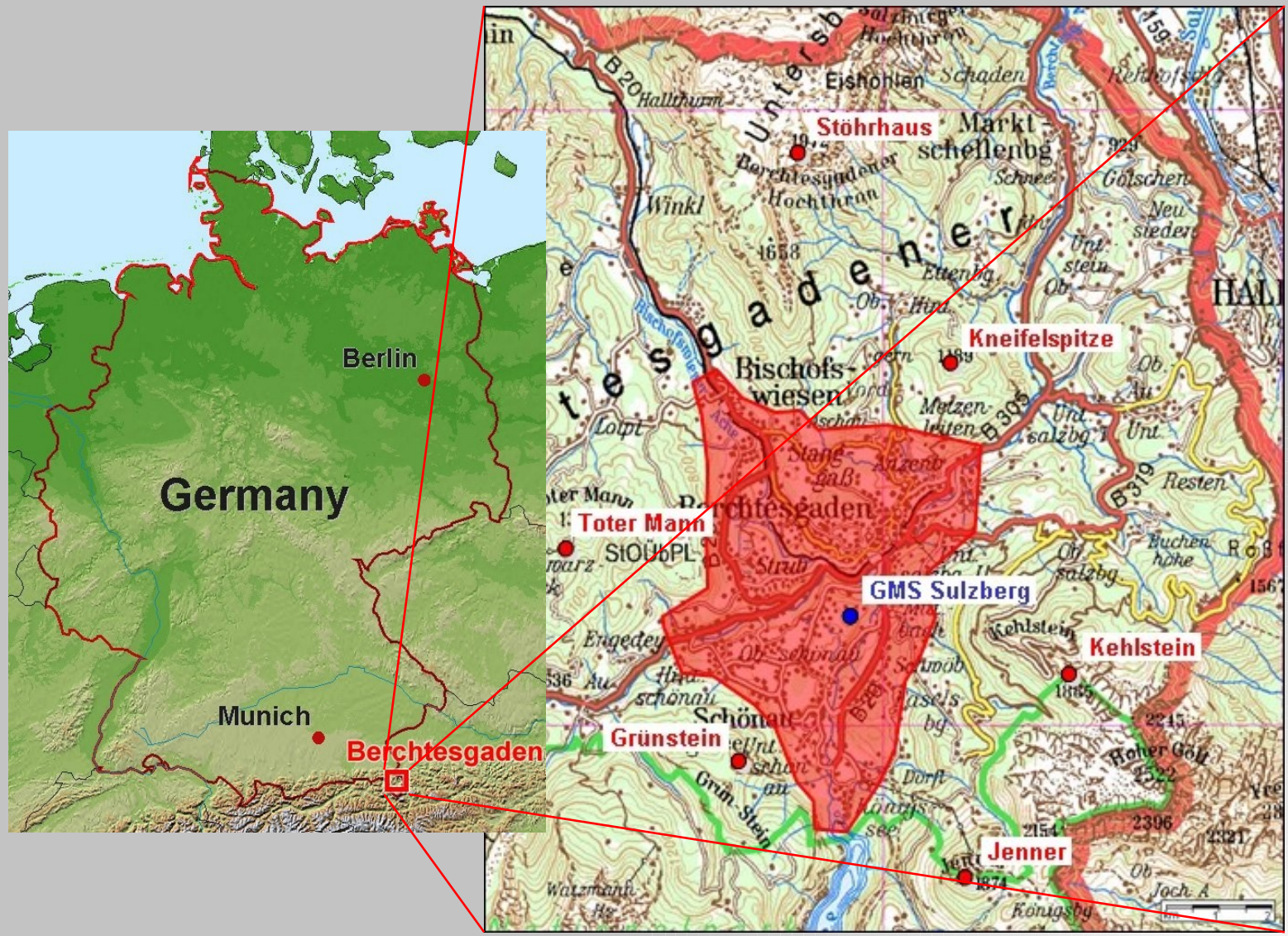
GATE Consortium



Relation to other Testbeds



Location Overview and Test Area



Impression of the Test Area



-> Mountains, forest, railway, streets, settlements, lake, tourism,

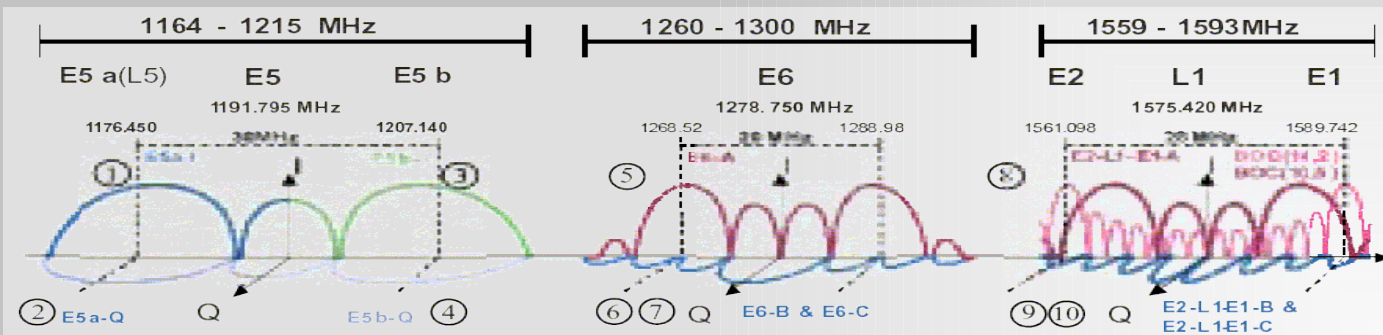
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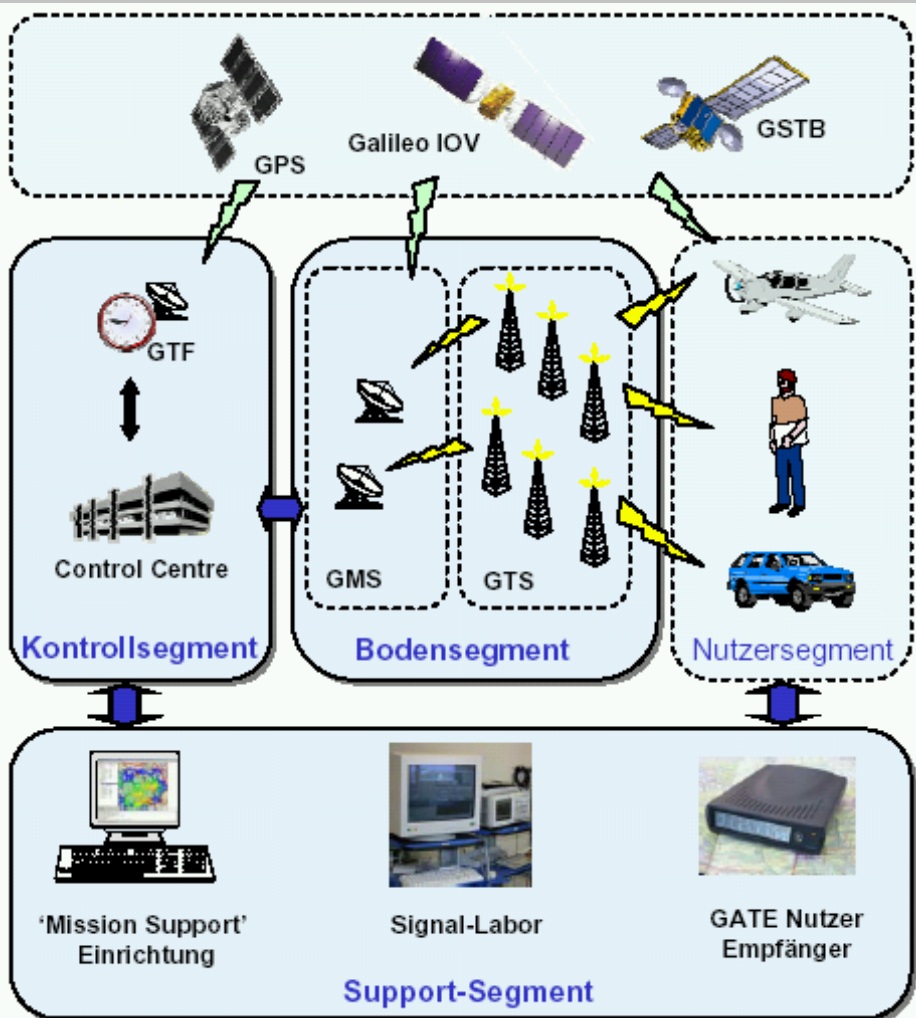
Signal Options

Due to the high flexibility of the signal generators many possible signal options can be tested. GATE offers the following signal options:

- 3 frequencies: L1, E6, E5a,b
- E5ab broadband signal
- Variable Doppler shift on the signal
- Different modulation schemes
- Flexible navigation data



GATE Infrastructure



Ground segment:

- 6 terrestr. transmitter (GTS)
- 2 monitoring receiver (GMS)

Control segment:

- Monitor- & Control facilities
- UTC Lab at DLR (GTF)
- Data processing
- Data archiv

Support Segment:

- Mission support facility
- GATE signal laboratory
- GATE test Receiver

User Segment:

- User Galileo Receiver



GATE Ground Segment



**Terrestrial transmitter (example „Störhaus“,
1894 m)**

**2 monitor receiver
(Sulzberg)**



Test Modes



• Pseudolite Mode (PM)

- > constant power levels
- > no signal steering (wrt. Phase and Doppler)
- > serving an arbitrary number of users (within the test area)

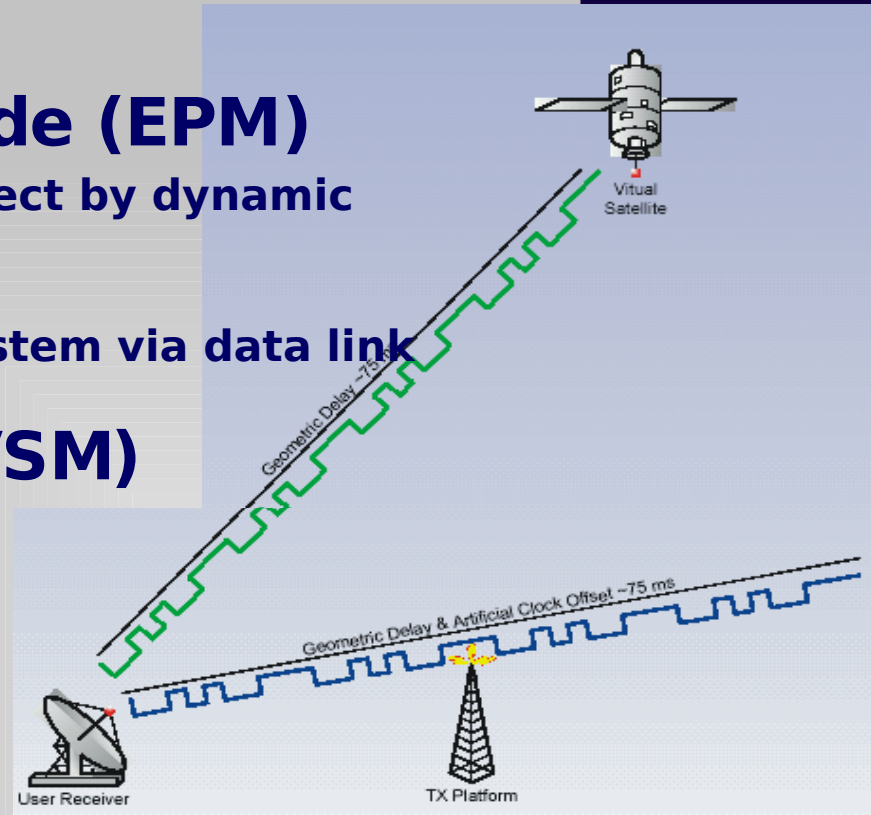
• Extended Pseudolite Mode (EPM)

- > compensation of the near / far effect by dynamic adjustment according to user position
- > fed back user position into the system via data link

• Virtual Satellite Mode (VSM)

- > Optimization power level
- > Computing signal delay
- > Shifting code phase, Doppler

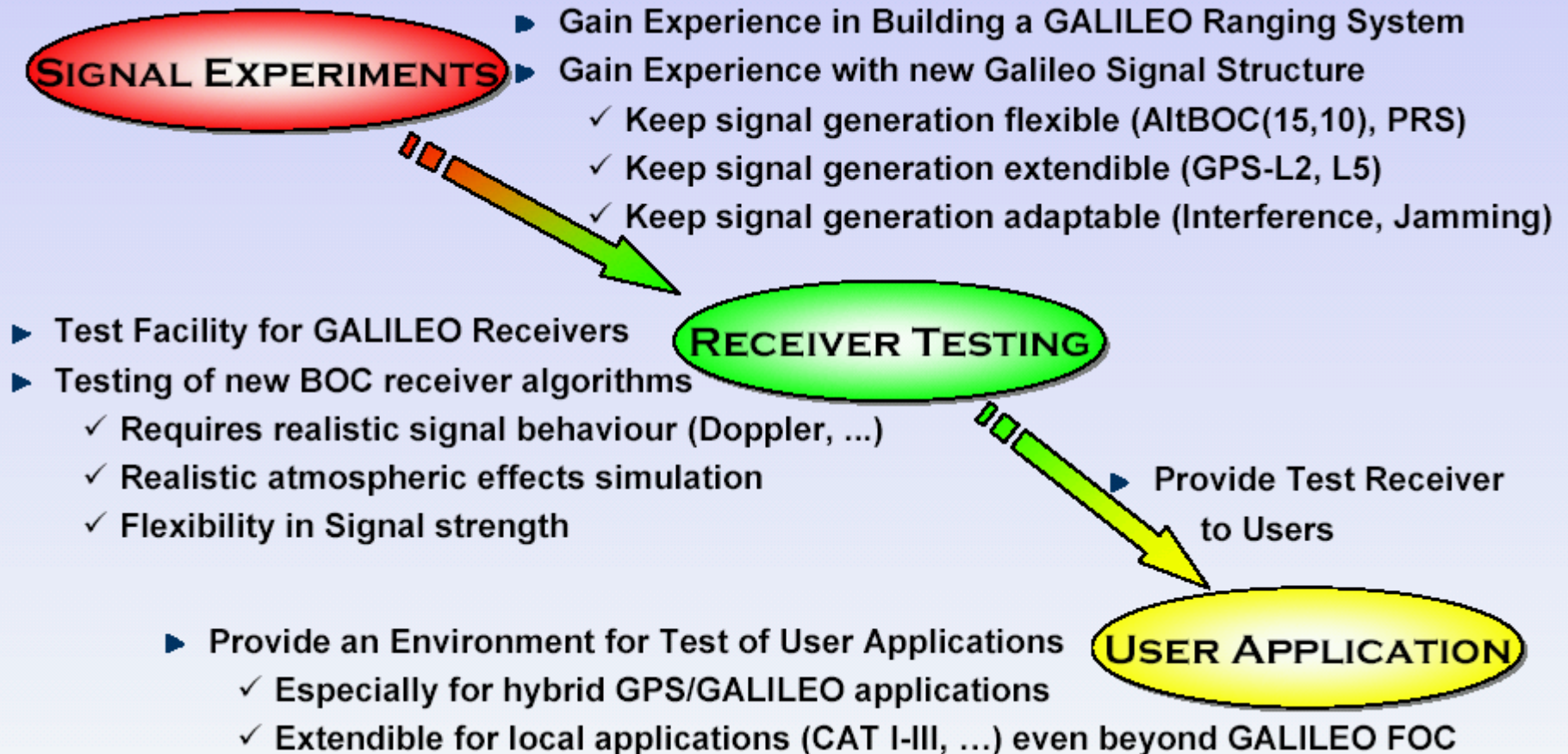
Emulating signal from orbit using user position !



GATE potentials



3 Major objectives to be covered by GATE:



Outlook

- **System design fixed in April 2005 (CDR)**
- **AIV till mid 2006**
- **Afterwards operation for:**
 - **α Tester**
 - **β Tester**
 - **Commercial Tester**
- **Interested in becoming a tester?**
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Thank you for your attention!

www.gate-testbed.com

