LoRa - APRS

Combining new technology with an existing, tested system

About this talk

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- About APRS
- About LoRa
- How it all began
- LoRa APRS vs. LoRa Wan
- Features now and outlook

About us

Mike Zwingl

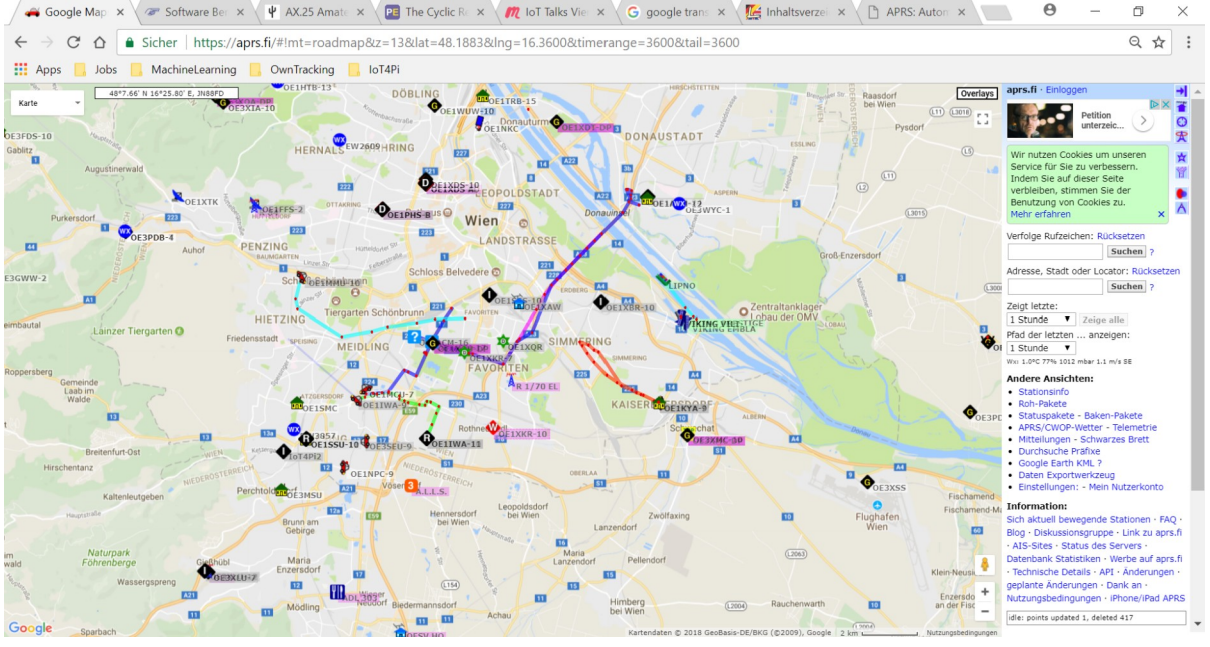
Alexander Pawlin

Karl Esztl

Bernd Gasser

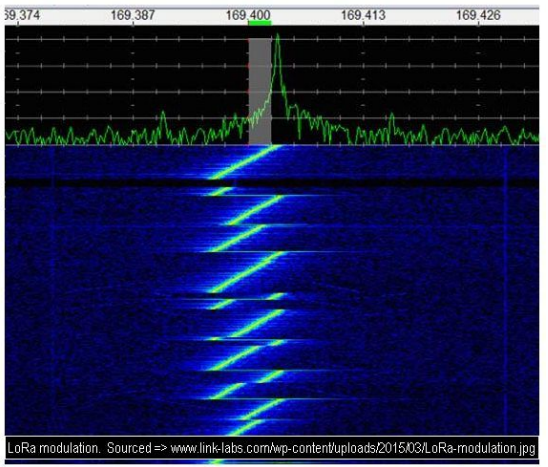
About APRS

- **Automatic Packet Reporting System (APRS)** is an amateur radio-based system for real time digital communications of information of immediate value in the local area. Data can include object Global Positioning System (GPS) coordinates, weather station telemetry, text messages, announcements, queries, and other telemetry. APRS data can be displayed on a map, which can show stations, objects, tracks of moving objects, weather stations, search and rescue data, and direction finding data.



About LoRa

- LoRa is a radio modulation format that gives longer range than straight FSK modulation. This is achieved by a combination of methods: it uses a spread spectrum technique called Chirp Spread Spectrum (CSS) and it uses forward error coding (in combination with whitening and interleaving).



About LoRa

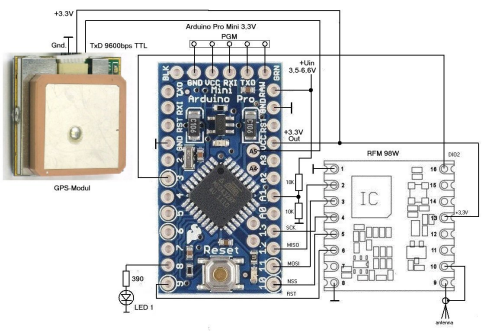
SingnalBandWidth	SpreadingFactor	Sensitivity(dbm)	ActualBandRate(pbs)
62.5kHz	SF=7	-126	2169
62.5kHz	SF=8	-129	**1187**
62.5kHz	SF=9	-132	**656**
62.5kHz	SF=10	-135	**296**
62.5kHz	SF=11	-137	**164**
62.5kHz	SF=12	-139	**91**
125kHz	SF=7	-123	4338
125kHz	SF=8	-126	2375
125kHz	SF=9	-129	1312
125kHz	SF=10	-132	733
125kHz	SF=11	-133	328
125kHz	SF=12	-136	183
250kHz	SF=7	-120	8676
250kHz	SF=8	-123	4750
250kHz	SF=9	-125	2624
250kHz	SF=10	-128	1466
250kHz	SF=11	-130	778
250kHz	SF=12	-133	366
500kHz	SF=7	-118	17353
500kHz	SF=8	-121	9501
500kHz	SF=9	-124	5249
500kHz	SF=10	-127	2932
500kHz	SF=11	-129	1557
500kHz	SF=12	-130	830

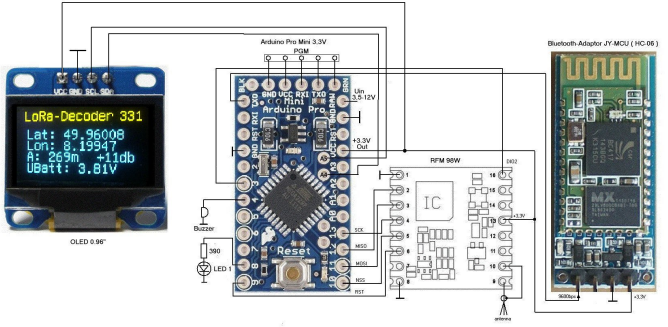
How it all began

- Dave Akerman Ballon Project

- Klaus Hirschelman DJ7OO http://www.kh-gps.de/lora.htm

Transmitter

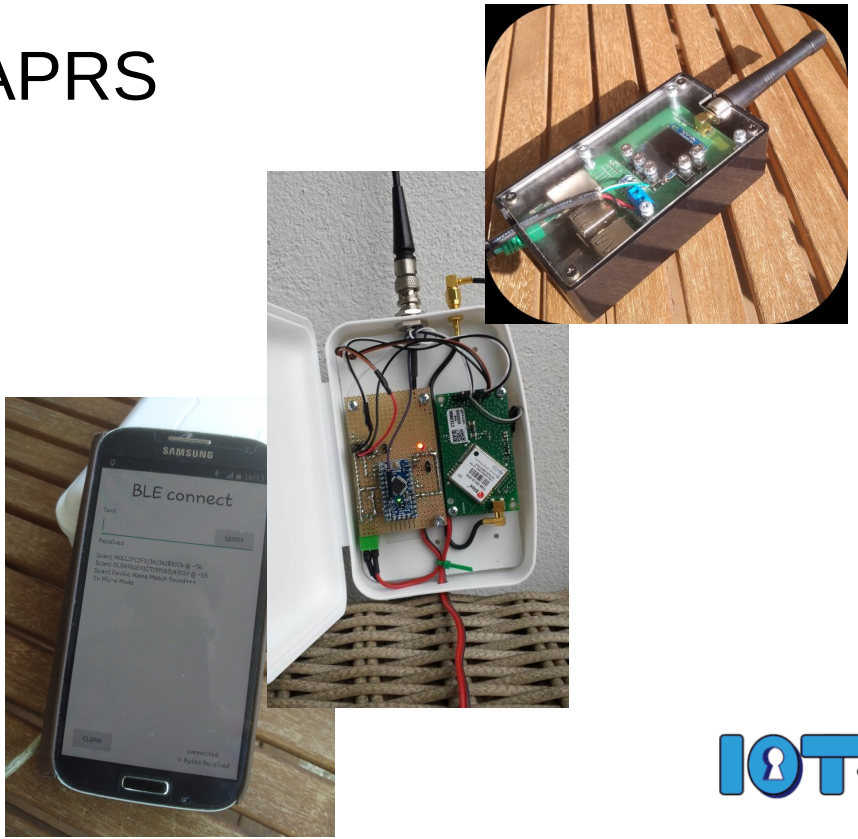




Receiver

How it all began

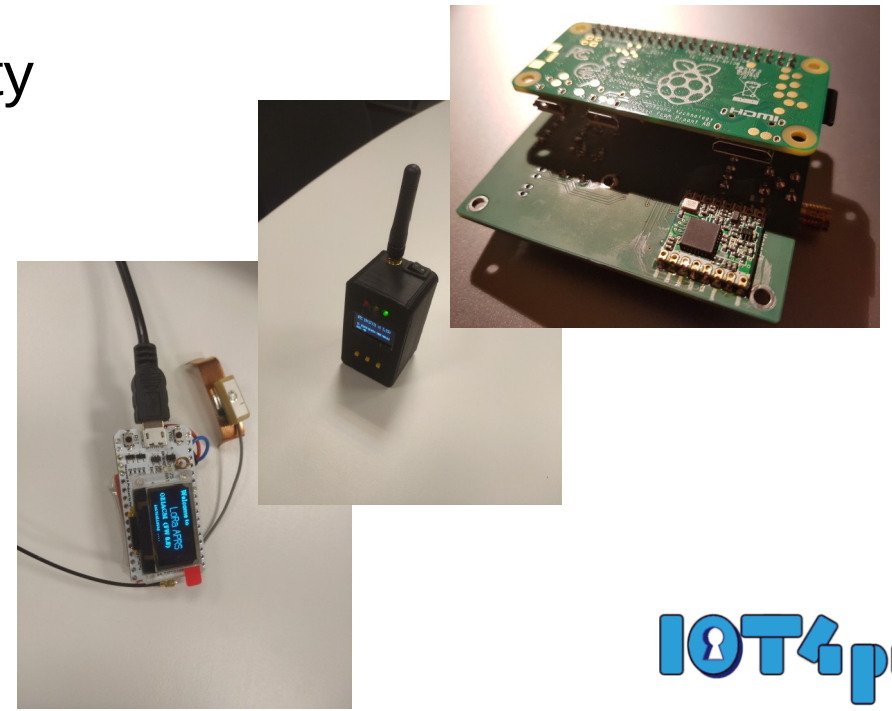
- Karl Esztl OE1KEB
  had the idea to connect to APRS
- LoRa APRS Gateway
  - GPS Transmitter
  - Repeater
  - BLE LoRa Transmitter



How it all began

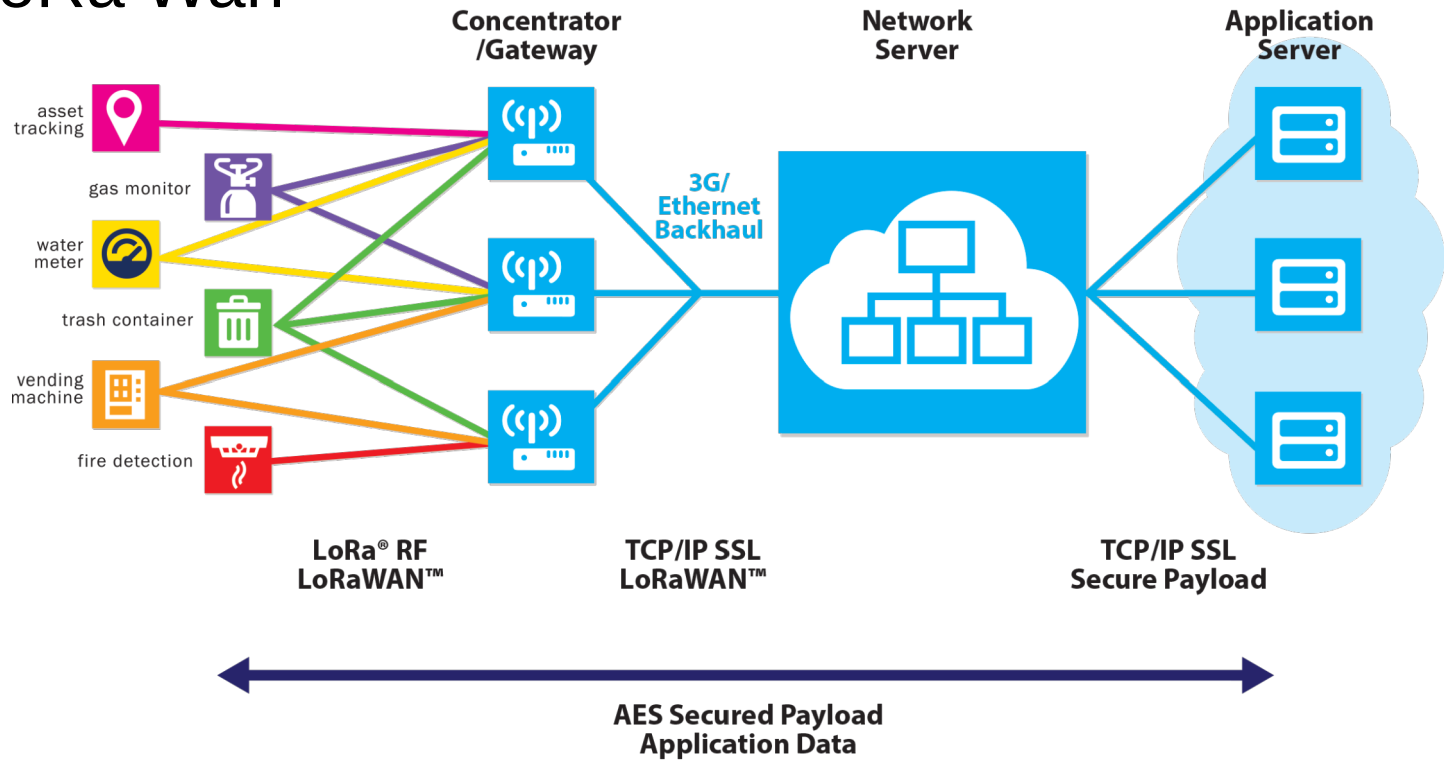
- ÖVSV
  - HAM Radio Friedrichshafen
  - Presentations in the community

… and they got creative

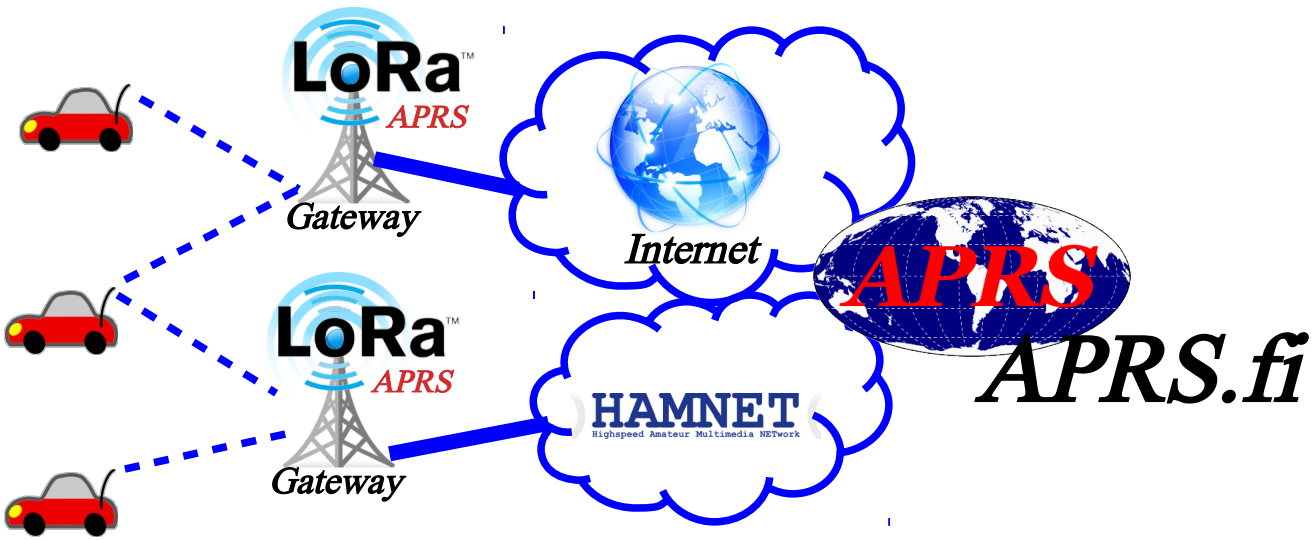


LoRa APRS vs. LoRa Wan

- LoRa Wan



LoRa APRS vs. LoRa Wan



LoRa APRS vs. LoRa Wan

Features	LoRaAPRS	LoRaWan
Frequency	433MHz	868MHz
# Channels	1 to 2	8
Encryption	no	**yes**
Own Application	no	yes
Map Integrated	yes	no
Audience	Amateur Radio	Everybody
Focus	Open Data	Own Data
	2-way Communication	(1-Way)

Features now and outlook

- Right now:
  - Frqu.:433.650MHz (& 434.040MHz)
  - BW: 125kHz
  - SF: 12
  - C/R:4/5
- Will change to be harmonized with other Applications to 433.775 MHz & 433.900MHz

Features now and outlook

- Sending Position
- Starting: Send and Receive Messages (2nd Frequency)
- Planning:
  - Weather Data
  - Air Quality
  - Telemetry
  - Message Bulletins

Further Information

- Links:
  - http://wiki.oevsv.at/index.php?title=Was_ist_HAM-IoT
  - http://www.iot4pi.com
  - https://groups.yahoo.com/neo/groups/lora_aprs/info (Yahoo group)
- Twitter:
  - https://twitter.com/Karl_OE1KEB
- email:
  - office@iot4pi.com