A public database of fun projects for innovation

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Introduction

Ham radio has – and has always had – all the ingredients to stay alive and relevant as an enjoyable hobby with multiple added benefits to the radio amateur and society.

However, for a long time, the key feature of amateur radio in the public perception – and also, to a large extent, the radio amateur's perception – has been the possibility to communicate with anyone. In this field, we are in competition with modern, simple to use and cheap means of communications? Why should anyone spend time, money and energy on passing the exam and setting up a radio station when they've got a mobile phone with an unlimited broadband subscription anyway? As insiders know very well and as the SWOT analysis in Annex 1 shows, amateur radio is much more than just a means of reducing the phone bill for those who manage to pass the licence exam. Moreover, this aspect, which is the most relevant aspect in the outside perception of amateur radio, has never been the only point of allowing amateur radio – it has not even been the dominant point ever. Otherwise, why should government have given us access to very valuable parts of the frequency spectrum almost for free? A comparison of today's activity on the repeaters with the activity in the 1980s and 1990s shows very clearly: there is hardly any demand for this kind of communication left even within the amateur radio community. So how can we expect our hobby to be perceived by outsiders?

At the same time, the success and breath of the open source software community and the maker groups show that there still is a large group of people who enjoy spending time with innovative technology-oriented hobbies in the community of like-minded people. So which is the barrier we need to lower? A new entry-level licence is the answer to a question that is of negligible importance since it helps in the field where we are competing with telephone companies – with a clear and known winner. An entry-level access to enjoyable experimentation in a global and innovative community, however, could open up new fields to those looking for a technical hobby, a fun way to access engineering and even public service. At the beginning, the biggest hurdle is probably the investment in equipment – until Internet become ubiquitous, it was easy to make do with little and have a lot of fun. It was not immediately obvious after a 5 min web search that tons of much better solutions existed already and it would be much easier to buy a finished, tested, working product for a ridiculously low price online. Computers were still simple and access to e.g. information on programming was hard to get without internet. There was an initial investment in equipment for electronics experimentation, there was an investment for computing experimentation. Today, the computer is available anyway, so there is no extra investment for computing experimentation / programming – today, it is near impossible to apply for a job, make a bank transfer or file a tax return without a computer. The licence exams were no multiple choice and required drawing schematics. Even the full licence exam of the time, however, was no problem at all after some years of fun with electronics.

Proposal

So the key question is: How to we create an entry-level access to our community? Could we set up a public data base of fun projects for innovation and technology oriented hobbyists with no or little experience and equipment? Ham radio goes well with programming, but electronics, communication, data analytics, citizen science – with web radios, one doesn't even need a personal radio to start with – are fun, too. The projects should give an indication about the level of complexity, required time (Weekend? Long weekend? Christmas holidays? Summer holidays? School project? Final project at school (see Funkamateur reports about such projects in France)? BSc/MSc Thesis project?), prerequisite knowledge, required equipment, others working on the subject looking for a teammate, whom to ask for advice, what to do with it once it's done, possible rewards (possibilities for publication (see www.junge-wissenschaft.ptb.de for many nice reports on entry-level research by (young) hobbyists), perhaps a prize for the best project proposal, best follow-up project proposal, best realisation, best documentation – with "best" to be defined). For instance, with data from the radio (e.g. APRS) and open mapping websites, one could draw coverage maps using offline radio data provided by a friendly radio amateur using KML files – who is going to enjoy this without thinking of getting a radio themselves? This could be interesting for volunteer firefighters or civil defence – they could identify problems in their region of interest with little initial investment and the flooding last summer showed that communication infrastructure can fail even in developed countries. Or putting together a receiver using DDS and mixer modules from the internet together with home-made filters and software to control it? Participate in a contest in the SWL category using a WebSDR without prior investment? Listen to an ARISS contact? Hear the beacon of an amateur radio satellite? Build a simple WSPR receiver with a makeshift antenna on a balcony and be amazed by who you can decode? Join an ARDF event and if you like it, build a receiver from a kit? Join a radio club for a field day? Join a ham on a SOTA trip? Build a blinker with 2 LEDs and extend it to 3 LEDs? Join an electronics competition and be the first to understand a given schematic or to build a circuit, from kit or from scratch? Since it is about enjoying a project, not about being the first to invent something, there is nothing wrong with doing a project that somebody else did already – to the contrary, all those who did it before show that it is possible and can provide assistance.

Annex 2 shows some examples of project proposals. If the industry could be interested in supporting the scheme, e.g. by sponsoring prizes, including internships, this could show young people that amateur radio projects are fun and open doors in professional life. It is common for job adverts, especially in radio magazines such as Funkamateur, to encourage applicants to mention their hobby projects, but such magazines are not commonly known to non-amateurs. All too often, non-amateurs see the cheap communications aspect first and foremost, which makes the hobby seem obsolete.

To invite participation and individual development at all levels, the proposals should include both assembly of kits and development of circuits more or less from scratch, with guidance and support by experienced radio amateurs.

Background

In many countries, any public action has to be in the public interest (see, e.g., Art. 5 Swiss constitution). The key points of public interest justifying the allocations are as relevant as they have always been:

- furthering knowledge / scientific experimentation;
- public service / emergency communications.

For amateur radio to survive in the increasing and increasingly cash-driven competition for frequency allocations, we need to address these two points.

One key point both points have in common is that they are of public interest and at the same time fun activities where innovative technologies can be developed, tested, adapted to unexpected circumstances and brought to perfection within a global community, which is a valuable skill valuable in many jobs as well.

The six key values of the amateur radio community as identified in the ham challenge 2022 announcement show in the “furthering knowledge / scientific experimentation” point.

The “public service / emergency communications” aspect shows in an increasing number of authorities establishing links, even with a contractual basis, to amateur radio clubs to make sure the required structures are established before the emergency. Here, amateur radio could be made known better to volunteer firefights and civil defence volunteers. This is clearly very important and worth doing, for the reason above, but also to show the value of amateur radio to the society. However, without the furthering knowledge / scientific experimentation point represented in amateur radio community at large, this point in isolation would not be attractive – amateur radio operators are less experienced than a 112/999 phone operator and we would lose the capability to adapt to unexpected circumstances sooner or later.

Implementation – Next steps

If the proposal is to be implemented, the next steps are the following.

- Find a group of volunteers to set up and maintain the system. It is key that the system is not run as a one man show since it should show the community aspect of amateur radio and a one man show depends too much on the one man’s continued availability.
- Set up a public online database for project proposals.
- Find suitable project proposals for beginners and more advanced hobbyists.
- Add more details to the examples given in Annex 2.
- Find partners (individual radio amateurs, clubs, IARU members, fab labs, organisations with similar interests – perhaps technical schools and applied universities looking for project ideas) providing local support.
- Find partners to increase the visibility, for instance amateur radio journals interested in publishing project reports and industry sponsoring prizes (financial or internships). Apart from the obvious financial motivation, industry links will show that the activity is relevant to future employers and not a waste of time.
- To increase the visibility, make the database known to relevant groups, e.g. open source programming community or electronics enthusiasts (e.g. www.mikrocontroller.net).

Annex 1. SWOT analysis

Table 1: SWOT analysis

	Helpful	Harmful
Internal origin	Strengths ~~S1. Cheap means of communication (phone and data)~~ (obsolete) ~~S2. Cheap means of communication where there is no phone line~~ (obsolete) S3. Independent and non-commercial means of communication (emergency, public service) S4. Hobby in a hobbyist's community – goal is to have fun together, no commercial competition → happy to share knowledge and spend time together S5. A lot of technical expertise in the community S6. Possibility for technical experimentation almost without limits S7. Outdoor fun: ARDF, SOTA, IOTA, field days, … S8. Worldwide community	Weaknesses W1. Entry barrier: If goal is to transmit, licence (exam) is necessary – a lot of effort before the first success (any exam is harder / more intimidating than no exam, so the novice licence doesn't help much) W2. Entry barrier: Initial financial investment seems higher than in other hobbies (possible solutions: use club's or fellow ham's equipment; suggest beginner's level projects) W3. Entry barrier: S6 is great for those who know their way, but newcomers get lost easily (possible solution: provide guidance) W4. Hard to share pleasure with outsiders: It is easy to explain the pleasure of winning a football match, but who will understand why it way so impressive to chat with somebody on another continent after so much effort? W5. "Amateur" is second-grade, just a first step to "professional" – but who needs "professional" radio operators anymore? (see O9) W6. The worldwide community is not necessarily very visible locally, which makes it hard for newcomers to make contact

	Helpful	Harmful
External origin	Opportunities O1. Entry barrier for computer-oriented hobbies has dropped dramatically (see T2) – Many new radio-related projects possible, entry level is low if data is made available to newcomers (e.g. APRS propagation analysis, CW/PSK/… skimmers, cheap SDRs) O2. Entry barrier for short-wave reception has dropped: WebSDR can be used for free O3. Setting up distributed projects online is straight-forward (see, e.g., open source community) – no need to find a local ham with similar interests any more O4. Communities of technology-oriented hobbyists exist – could establish links (e.g. through amateur radio related open source projects) O5. Globalised economy: amateur radio contacts (exposure to language, culture, …) can give an edge O6. World-wide tourism is mainstream – amateur radio contacts can go beyond superficial contacts O7. Simple means of communicating successes (see W4): online, in entry-level scientific journals like www.junge-wissenschaft.ptb.de) O8. Importance of independent means of communication and emergency preparedness became more apparent again recently (e.g. floodings in Europe 2021) O9. Good engineers are hard to find and young engineers fresh from school/university have no experience – unless they started early as hobbyists (see W5)	Threats T1. Commercial communication is very cheap (flatrates on landlines, mobile phones, internet); S1 and S2 not attractive any more (repeaters are almost empty, packet radio almost disappeared) T2. Entry barrier for computer-oriented hobbies (programming etc.) has dropped dramatically: computers are cheap and mainstream today (see O1) T3. Entry barrier: Setting up antennas has become difficult in many countries T4. Many hobbies *seem* more attractive and give earlier gratification

Annex 2. Project ideas

The following ideas are just examples to illustrate possible projects. If the proposal is implemented, the last field will include a link to more detailed information. The information shown in the table should be presented in a way that allows interested future radio amateurs to filter interesting projects based on their prior knowledge, interest and time.

The following list of project ideas contains only some examples to stimulate others to develop proposals. It is by far not exhaustive. For instance, it does not include some obvious projects like passing the licence exam and setting up a transceiver (HF, VHF, UHF; phone, CW, WSPR, …) since those are obvious to those who found their interest. The target of the overall proposal “A public database of fun projects for innovation” is to catch the interest of newcomers. It should show that the entry barrier is low and small, manageable step lead to impressive and fun results.

General topic, level: Electronics, Beginner
Title: Relay driver
Description: A driver is a simple circuit that is needed when, for instance, a microcontroller is intended to switch a load, here a relay, that needs more current than the microcontroller can deliver. A relay works like a simple switch, but rather than being operated manually, it opens or closes the circuit depending on a control current.
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): Simple power supply (e.g. battery), breadboard or soldering equipment and veroboard, starter kit of resistors, NPN transistors such as BC548, simple diode such as 1N4148, relay (any type, voltage corresponding to battery), switch (any type) Buy: usual suppliers (add commercial names if desired and acceptable, with shopping list) Borrow or use: see local contact – any ham will be able to help
Time required: 1 day
Acquired knowledge: Basic knowledge about transistors and relays.
Possible follow-up projects: Blinker (Multivibrator) Alarm clock
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Electronics, Beginner
Title: Blinker (Multivibrator)
Description: This blinker will light two LEDs in alternation for a time to be chosen by the experimenter, e.g. 1 s.
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): Simple power supply (e.g. battery), breadboard or soldering equipment and veroboard, starter kit of resistors and electrolytic capacitors, NPN transistors such as BC548, LEDs Buy: usual suppliers (add commercial names if desired and acceptable, with shopping list) Borrow or use: see local contact – any ham will be able to help
Time required: 1 day
Acquired knowledge: Basic knowledge about transistors, resistors, capacitors and LEDs.
Possible follow-up projects: Chase light (Blinker with more than 2 LEDs)
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Electronics, Beginner
Title: Chase light (Blinker with 3 LEDs)
Description: This chase light is an extension of the blinker (multivibrator) to three LEDs. The LEDs will light one after the other and stay lit for a time to be chosen by the experimenter, e.g. 1 s.
Required knowledge: Experiment “Blinker (multivibrator)”
Required equipment, where to get it (buy/borrow/use): Simple power supply (e.g. battery), breadboard or soldering equipment and veroboard, starter kit of resistors and electrolytic capacitors, NPN transistors such as BC548, LEDs Buy: usual suppliers (add commercial names if desired and acceptable, with shopping list) Borrow or use: see local contact – any ham will be able to help
Time required: 1 day
Acquired knowledge: Basic knowledge about transistors, resistors, capacitors and LEDs.
Possible follow-up projects:
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Electronics, Beginner
Title: Morse keyer
Description: Assemble an electronics kit to build a simple Morse keyer
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): Kit Basic soldering equipment (any radio amateur can help)
Time required: 2 h
Acquired knowledge: Soldering technique Basic knowledge about electronic circuits
Possible follow-up projects: Any electronics project
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Radio, Beginner (no licence needed)
Title: Listen to amateur radio contacts online
Description: Some amateur radio receivers can be accessed through the Web free of charge, e.g. http://websdr.ewi.utwente.nl:8901/ . Use one of these to listen to amateur radio contacts without having to buy and set up your own equipment. Have a look at how the propagation changes at night and day, depending on the frequency. With their callsigns, check in which country they are based and have a look on the map. Many radio amateurs publish more information about them and their station on qrz.com . Have a look.
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): PC with internet connection
Time required: 1 h
Acquired knowledge: Basic knowledge about amateur radio on shortwave, including propagation
Possible follow-up projects: Decode digital amateur radio contacts with online receivers
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Foreign languages and radio, Beginner (no licence needed)
Title: Listen to amateur radio contacts in a foreign language online
Description: Some amateur radio receivers can be accessed through the Web free of charge, e.g. http://websdr.ewi.utwente.nl:8901/ . Use one of these to listen to amateur radio contacts without having to buy and set up your own equipment. Use you foreign language skill in practice – look for radio amateurs speaking a foreign language you know. With their callsigns, check in which country they are based and have a look on the map. Many radio amateurs publish more information about them and their station on qrz.com . Have a look.
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): PC with internet connection
Time required: 1 h
Acquired knowledge: Basic knowledge about amateur radio on shortwave Practice in a foreign language
Possible follow-up projects: Decode digital amateur radio contacts with online receivers
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Radio, Beginner (no licence needed)
Title: Decode digital amateur radio contacts with online receivers
Description: Radio amateurs use digital modes of communication to exchange text and images. Use one amateur radio receivers that can be accessed through the Web free of charge, e.g. http://websdr.ewi.utwente.nl:8901/ , and free decoding software such as FLDIGI to read some messages.
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): PC with internet connection
Time required: 3 h
Acquired knowledge: Basic knowledge about amateur radio on shortwave, including propagation Basic knowledge about digital modes of communication
Possible follow-up projects: …
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Radio, Beginner (no licence needed)
Title: See position of radio amateurs on an online map in real time
Description: Radio amateurs operate beacons that send their position when travelling, e.g. by car. Other radio amateurs receive these transmissions and forward them to the Web. Have a look at the activity in your region online on aprs.fi .
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): PC with internet connection
Time required: 15 min
Acquired knowledge: Basic knowledge about amateur radio
Possible follow-up projects: …
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Radio, Beginner (no licence needed)
Title: Listen to an amateur radio satellite or even ISS
Description: Radio amateurs build satellites. Those can be used free of charge and usually include a beacon. The beacon transmits a defined message and can be received without an amateur radio licence. Some satellites can be received with simple equipment, such as a handheld radio and a simple antenna. Most amateur radio satellites are not geostationary – they are not permanently receivable from any one place on the earth. Check when the satellite of your choice is receivable from your position and receive its beacon. If you are lucky, you can even listen to an amateur radio contact and decode telemetry data. Even on the ISS, there is an amateur radio station (www.ariss.org). Some satellites are even build by school groups (e.g. www.maxvaliersat.it for a example). Variation: Receive WSPR beacons from Antarctica on short wave (e.g. www.qrz.com/db/DP0GVN).
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): Amateur radio receiver (VHF or UHF) with simple antenna (any radio amateur can help)
Time required: 4 h
Acquired knowledge: Basic knowledge about amateur radio using satellites
Possible follow-up projects: …
Proposer: HB9FEU
Local contact/support: AMSAT members …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Radio, Beginner (no licence needed)
Title: Get confirmations of your reception to radio amateurs
Description: Radio amateurs confirm their contacts by sending paper “QSL” cards through their radio clubs or eqsl.cc , a free online solution. They enjoy getting reception reports from listeners, who often don’t have a radio licence, and reply. Set up your account on eqsl.cc, listen to some amateur radio conversations and send your reception report. If you enjoy it, design your own QSL card.
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): PC with internet connection
Time required: 1 h
Acquired knowledge: Basic knowledge about amateur radio
Possible follow-up projects: …
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Radio, Beginner (no licence needed)
Title: Join an amateur radio direction finding event
Description: Radio amateurs enjoy a variation of orienteering races where the waypoints are marked by transmitters – you will be given a receiver and you will look for and find the transmitters.
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): Usually lend on site
Time required: 1 day
Acquired knowledge: Basic knowledge of radio direction finding
Possible follow-up projects: …
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level:

Radio, Beginner (no licence needed)

Title:

Join an amateur radio field day

Description:

Radio amateurs enjoy operating from outside. Radio clubs and single operators take part in so-called field days, where a radio station is set up outdoors for a limited duration, typically a day or a weekend. Join them, take part in setting up the station, help the operators, listen to the radio, take part in taking the station down.

Required knowledge:

None

Required equipment, where to get it (buy/borrow/use):

None

Time required:

As desired, between 1 h and 1 weekend

Acquired knowledge:

Basic knowledge about

- setting up a radio station
- operating procedures
- log keeping
- propagation
- radio competition ("contest") techniques
- the radio club

Possible follow-up projects:

…

Proposer:

HB9FEU

Local contact/support:

…

Possible prizes / competitions / sponsors:

…

Link: Find more detailed information here.

General topic, level:

Radio, Beginner (no licence needed)

Title:

Join a radio amateur for a “summit on the air” outing

Description:

Radio amateurs enjoy operating from outside. The “summit on the air” (SOTA) programme was designed for radio amateur enjoying operating from mountain tops. Join one of them.

Required knowledge:

None

Required equipment, where to get it (buy/borrow/use):

None

Time required:

1 day

Acquired knowledge:

Basic knowledge about

- setting up a radio station
- operating procedures
- log keeping
- propagation
- operating from a mountain top

Possible follow-up projects:

…

Proposer:

HB9FEU

Local contact/support:

…

Possible prizes / competitions / sponsors:

…

Link: Find more detailed information here.

General topic, level: Radio, Beginner (no licence needed)
Title: Join a Youngsters On The Air (YOTA) event
Description: “YOTA is a quickly growing group of young radio amateurs from IARU Region 1. It is our goal to get more young people interested in amateur radio and grow the amateur radio community. Every summer around 80 youngsters meet up in a different IARU Region 1 country every year for a week of exchanging ideas and experiences. At the summer camp youngsters learn how to organise youth activities in their own countries, for example presentations at schools, smaller camps for youngsters and more. All to get more young people fascinated by amateur radio. During the year youngsters organise a number of sub-regional camps for a smaller number of youngsters, also those who do not have a license yet. There are also young contest teams, special callsigns, and lots of other activities.” [www.ham-yota.com]
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): None
Time required: Depends on your choice
Acquired knowledge: Introduction to amateur radio Contact points for youngsters interested in amateur radio
Possible follow-up projects: …
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Programming, Basic
Title: Convert “locator” into geographical co-ordinates
Description: Amateur radio operators invented a system to state their geographical location in a compressed way with convenient trade-off between resolution and length of the code word. This code word is called “locator”. It is used to calculate where to direct an antenna to and the distance. For instance, the locator of Eiffel tour in Paris is JN18DU. Using the locator, calculate the geographical co-ordinates of a radio station. Determine your own co-ordinates and calculate the direction and the distance of the other radio station from your position.
Required knowledge: A programming language
Required equipment, where to get it (buy/borrow/use): PC
Time required: 1 day
Acquired knowledge: “Locator” system
Possible follow-up projects: Mark location of radio stations on an online map
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Electronics and programming, Intermediate
Title: Morse code talking clock with computer
Description: Programme a clock on a computer. The clock will beep the time in Morse code when requested to and, during daytime, at the stroke of the hour. Option: If the computer does not have a loudspeaker, send pulses on a digital output to the relay driver (see experiment “relay driver”) where the relay is replaced by a buzzer.
Required knowledge: A programming language
Required equipment, where to get it (buy/borrow/use): Computer (PC, Raspberry Pi, …) Option: Relay driver (see experiment “relay driver”) without relay, buzzer
Time required: 1 weekend Option: 1 weekend
Acquired knowledge: Basics of Morse code
Possible follow-up projects: Morse code talking clock with computer
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Electronics and programming, Intermediate
Title: Morse code talking clock with a microcontroller
Description: Programme a clock on a microcontroller. The clock will beep the time in Morse code when requested to and, during daytime, at the stroke of the hour. Send pulses on a digital output to the relay driver (see experiment “relay driver”) where the relay is replaced by a buzzer.
Required knowledge: A programming language for microcontrollers Experiment “Morse code talking clock with a computer”
Required equipment, where to get it (buy/borrow/use): Microcontroller (Arduino, Atmel, PIC, …) Relay driver (see experiment “relay driver”) without relay, buzzer
Time required: 1 week
Acquired knowledge: Basics of Morse code
Possible follow-up projects:
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Electronics and programming, Intermediate
Title: Radio controlled clock (synchronised using longwave time signals or GPS)
Description: Synchronise your clock to a reference time source.
Required knowledge: Experiment “Morse code talking clock with a computer” or Experiment “Morse code talking clock with a microcontroller”
Required equipment, where to get it (buy/borrow/use): PC or microcontroller (Arduino, Atmel, PIC, …) Longwave time signal (e.g. DCF 77) or GPS receiver
Time required: 1 week
Acquired knowledge: GPS or time code transmission basics
Possible follow-up projects:
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Programming, Intermediate
Title: Mark location of radio stations on an online map
Description: Amateur radio operators invented a system to state their geographical location in a compressed way with convenient trade-off between resolution and length of the code word. This code word is called “locator”. It is used to calculate where to direct an antenna to and the distance. For instance, the locator of Eiffel tour in Paris is JN18DU. Using the locator, mark the approximate location of the station you are receiving on a digital map, e.g. OpenStreetMap, in real time or generate a file, e.g. KML, that can be imported into such a digital map.
Required knowledge: A programming language “Locator” system
Required equipment, where to get it (buy/borrow/use): PC
Time required: 3 days
Acquired knowledge: Interfacing a digital map
Possible follow-up projects: Receive APRS beacons and mark location of transmitters on an online map
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Radio and programming, Intermediate
Title: Receive APRS beacons and mark location of transmitters on an online map
Description: Radio amateurs operate beacons that send their position when travelling, e.g. by car. Other radio amateurs receive these transmissions and forward them to the Web. Decode the data send by these transmitters. Mark the approximate location of the station you are receiving on a digital map, e.g. OpenStreetMap, in real time or generate a file, e.g. KML, that can be imported into such a digital map.
Required knowledge: Experiment “See position of radio amateurs on an online map in real time” Experiment “Mark location of radio stations on an online map” A programming language
Required equipment, where to get it (buy/borrow/use): PC FM receiver for APRS (frequency used in Europe: 144.800 MHz) Packet radio decoder (e.g. a “TNC”)
Time required: 1 week
Acquired knowledge: Set up of a APRS receiver station Decoding of APRS data
Possible follow-up projects: Propagation analysis with APRS
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Radio, Intermediate (no licence needed)
Title: Set up your own, simple receiving station
Description: Radio receivers do not need to be expensive. Basic receivers can be built using USB dongles sold as television receivers. Using such a receiver and free software, set up your own amateur radio receiving station.
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): PC USB television receiver Free software Simple antenna (e.g. connector to receiver and wires)
Time required: 1 day for the receiver 1 day for the antenna
Acquired knowledge: SDR (“software defined radio”) software Antenna design
Possible follow-up projects: …
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Radio, Intermediate (no licence needed)
Title: Set up your own, simple receiving station for aeroplane beacons (Automatic Dependent Surveillance-Broadcast (ADS-B))
Description: Radio receivers do not need to be expensive. Basic receivers can be built using USB dongles that are sold as television receivers. Using such a receiver and free software, set up your own receiving station to track aeroplanes. Warning: Listening to these beacons may not be authorised in some countries.
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): PC USB television receiver Free software Simple antenna (e.g. connector to receiver and wires)
Time required: 1 day for the receiver 1 day for the antenna
Acquired knowledge: SDR (“software defined radio”) software Antenna design Aeroplane beacons (Automatic Dependent Surveillance-Broadcast (ADS-B))
Possible follow-up projects: …
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Any topic, any level
Title: Publish a report on your project
Description: This platform thrives because everybody's ideas can stimulate everybody else's activity. Document your project and publish your report on the platform or even in an amateur radio magazine.
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): Completed project
Time required: ½ of the duration of your project
Acquired knowledge: Documentation of your technical work – an important skill. Deeper understanding of your work – explaining to others helps
Possible follow-up projects:
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.

General topic, level: Any topic, any level
Title: Contribute your own project idea to the community platform
Description: This platform thrives because everybody's ideas can stimulate everybody else's activity. Propose a new project.
Required knowledge: None
Required equipment, where to get it (buy/borrow/use): Project idea
Time required: Depending on the project idea
Acquired knowledge: Documentation of your idea in a way that others can understand it – an important skill
Possible follow-up projects:
Proposer: HB9FEU
Local contact/support: …
Possible prizes / competitions / sponsors: …
Link: Find more detailed information here.