



# **Technician License Course**



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## **Chapter 6**

### **Lesson Plan Module – 14**

**Communicating with Other Hams – Part 2  
Nets, Emergency Communications, Special  
Modes and Techniques**



# Nets

- Net is short for “Network”
  - Evolved over the years to share and exchange information in an organized and efficient way
- Social nets
- Traffic nets
- Emergency and public service nets



## Traffic Nets

- *Traffic* refers to formal messages that are relayed via Amateur Radio
  - Radiogram structured to ensure accuracy
- National Traffic System (NTS)
  - Procedures
  - Accountability



## Emergency and Public Service Nets

- Public service nets – training for emergency nets
  - Training for ham operators as well as emergency groups and managers supported by Amateur Radio
- Emergency nets



# Net Structure


- Net Control Station (NCS)
  - Traffic cop who controls the flow of information
- Check-in and check-out procedures
  - Priority/Emergency access to Net Control
- Communications discipline vital
  - Learn and follow procedures



## Net Structure

- Speak only when directed, and only to whom directed
- Follow through with your commitments

# The Radiogram



The American Radio Relay League  
**RADIOGRAM**  
 Via Amateur Radio

Number	Precedence	HX	Station of Origin	Check	Place of Origin	Time Filed	Date
207	P	E	W1FN	10	LEBANON NH	1200 EST	JAN 4

To:

**MARK DOE**  
**RED CROSS DISASTER OFFICE**  
**123 MAIN ST**  
**RUTLAND VT 05701**

Telephone Number: **802-555-1212**

This Radio Message was received at:

Amateur Station \_\_\_\_\_ Date \_\_\_\_\_

Name \_\_\_\_\_

Street Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

<u>NEED</u>	<u>MORE</u>	<u>COTS</u>	<u>AND</u>
<u>KITS</u>	<u>AT</u>	<u>ALL</u>	<u>FIVE</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

**JOAN SMITH SHELTER MANAGER**

REC'D	From	Date	Time	SENT	To	Date	Time

A licensed Amateur Radio Operator, whose address is shown above, handled this message free of charge. As such messages are handled solely for the pleasure of operating, a "Ham" Operator can accept no compensation. A return message may be filed with the "Ham" delivering this message to you. Further information on Amateur Radio may be obtained from ARRL Headquarters, 225, Main Street, Newington, CT 06111.

The American Radio Relay League, Inc. is the National Membership Society of licensed radio amateurs and the publisher of QST Magazine. One of its functions is promotion of public service communication among Amateur Operators. To that end, The League has organized the National Traffic System for daily nationwide message handling.





# Supporting Emergency Operations

- One of the most important reasons for the existence of Amateur Radio.
- Get involved and use what you have learned.
- Know where you fit in the overall emergency management team.



# Emergency Communications Organizations

- Radio Amateur Civil Emergency Service (RACES).
  - Supports civil emergencies
  - National in scope
- Amateur Radio Emergency Service<sup>®</sup> (ARES<sup>®</sup>).
  - Local and regional in scope
  - Supports non-governmental agencies



## Emergency Communication Tips

- Don't become part of the problem.
- You are a communicator, not a decision or policy maker.
- Don't give out unauthorized information.
- Know your abilities and limitations — keep yourself safe.
- Follow radio discipline and net procedures.
- Protect personal information — Amateur Radio communications is public.



## Emergency Declarations

- FCC may declare a Temporary State of Communications Emergency.
  - Includes details of conditions and rules to be followed.
  - Specifics communicated through web sites and ARRL bulletins, the NTS, and on-the-air.
  - Avoid operating on restricted frequencies unless engaged in relief efforts.



## Making and Answering Distress Calls

- Rule number one – speak in plain language!
- Mayday (voice); SOS (Morse code)
- Identify
- Give location
- State the situation
- Describe assistance required
- Provide other important information



# Tactical Communications

- Tactical Identifiers
  - Facilitate communications
  - Location- or function-specific
  - Transcends operator changes
- FCC ID rules still apply
  - Give your FCC call sign every 10 minutes and when changing operators



# Emergency Equipment

- “Go-kits”
  - Portable Amateur Radio equipment
  - Emergency power sources
  - Personal survival supplies and equipment



# Emergency Communications Training

- If you are going to participate, get training.
- Actively participate in training and drill activities.
  - Nets
  - Public service activities
  - Attend community meetings and get involved in your community.





# Emergency Communications Training

- Take emergency communication courses.
  - ARRL courses
  - FEMA courses on NIMS and other topics
    - May be required for your participation



## Awards, DXing, Contests

- On-the-air activities provide incentive to get on the radio.
- Learn about propagation as you search for specific stations on various bands.
- Improve operating skills.
- Fun!



## Awards

- WAC
  - Contacting all six inhabited continents
- WAS
  - Contacting 50 states
- VUCC
  - Contacting 100 grid squares on VHF/UHF



## DXing

- Contacting stations far away – a tradition since the first days of radio.
- On HF, usually means contacting stations in other countries.
- On VHF/UHF, means contacting stations outside your normal coverage area.



# Contests

- ARRL Rookie Roundup
- North American QSO Parties ([ncjweb.com](http://ncjweb.com))
- State QSO Parties
- VHF/UHF Contests
- CQ World Wide DX Contest (a big one!)
- Contest Calendars



## Field Day

- Emergency communications training with a competitive spirit.
- Set up portable station and antenna (in the field, mobile, anywhere!) and make as many contacts as possible.
- Get started with your local club or group – great way to get involved.



## Special Events

- Special Event stations are set up to commemorate some significant local event.
- Usually stations are demonstration stations set up for public display.
- Commemorative certificates are awarded for contacting the stations.



## Radio Direction Finding

- Useful for locating interference or noise sources.
- Works best with a directional antenna.
- “Fox hunting” competitions offer a fun opportunity to learn and practice.
- Good training for search and rescue.





# Amateur Satellites

- OSCAR
- Orbiting Satellites Carrying Amateur Radio
- Modes
  - FM
  - Analog (SSB and CW)
  - Digital
- International Space Station



## Satellite Terms

- Uplink – Earth stations transmit to satellite
- Downlink – Satellite transmits to stations on Earth
- Beacon – Signal from satellite with information about satellite operating conditions
- Doppler Shift – Shift in frequency due to relative motion between satellite and Earth station
- LEO – Low Earth Orbit

## Satellite Terms

- Spin fading – caused by rotation of satellite
- Pacsat – packet radio satellite
- Tracking software – gives beam heading and times when satellite is in view
- Mode – bands satellite is using for uplink and downlink (eg Mode U/V = 70 cm uplink, 2 meters downlink)

## Other Special Modes

- Slow Scan TV (SSTV)
  - Sending snap-shot pictures
  - One frame every few seconds
- Amateur TV (ATV)
  - Similar to commercial TV imagery
  - Uses analog TV format (NTSC)



## Other Special Modes

- Radio Control (RC)
- Telecommand
- 50 MHz band





Practice Questions



What is the FCC Part 97 definition of telemetry?



What is the FCC Part 97 definition of telemetry?

A one-way transmission of measurements at a distance from the measuring instrument





What is the FCC Part 97 definition of telecommand?




What is the FCC Part 97 definition of telecommand?

A one-way transmission to initiate, modify or terminate functions of a device at a distance



When do the FCC rules NOT apply to the operation of an amateur station?



When do the FCC rules NOT apply to the operation of an amateur station?

Never, FCC rules always apply



What do RACES and ARES have in common?





What do RACES and ARES have in common?

Both organizations may provide communications during emergencies



What describes the Radio Amateur Civil Emergency Service (RACES)?



What describes the Radio Amateur Civil Emergency Service (RACES)?

A radio service using amateur frequencies for emergency management or civil defense communications

A radio service using amateur stations for emergency management or civil defense communications

An emergency service using amateur operators certified by a civil defense organization as being enrolled in that organization






Which of the following is an accepted practice to get the immediate attention of a net control station when reporting an emergency?

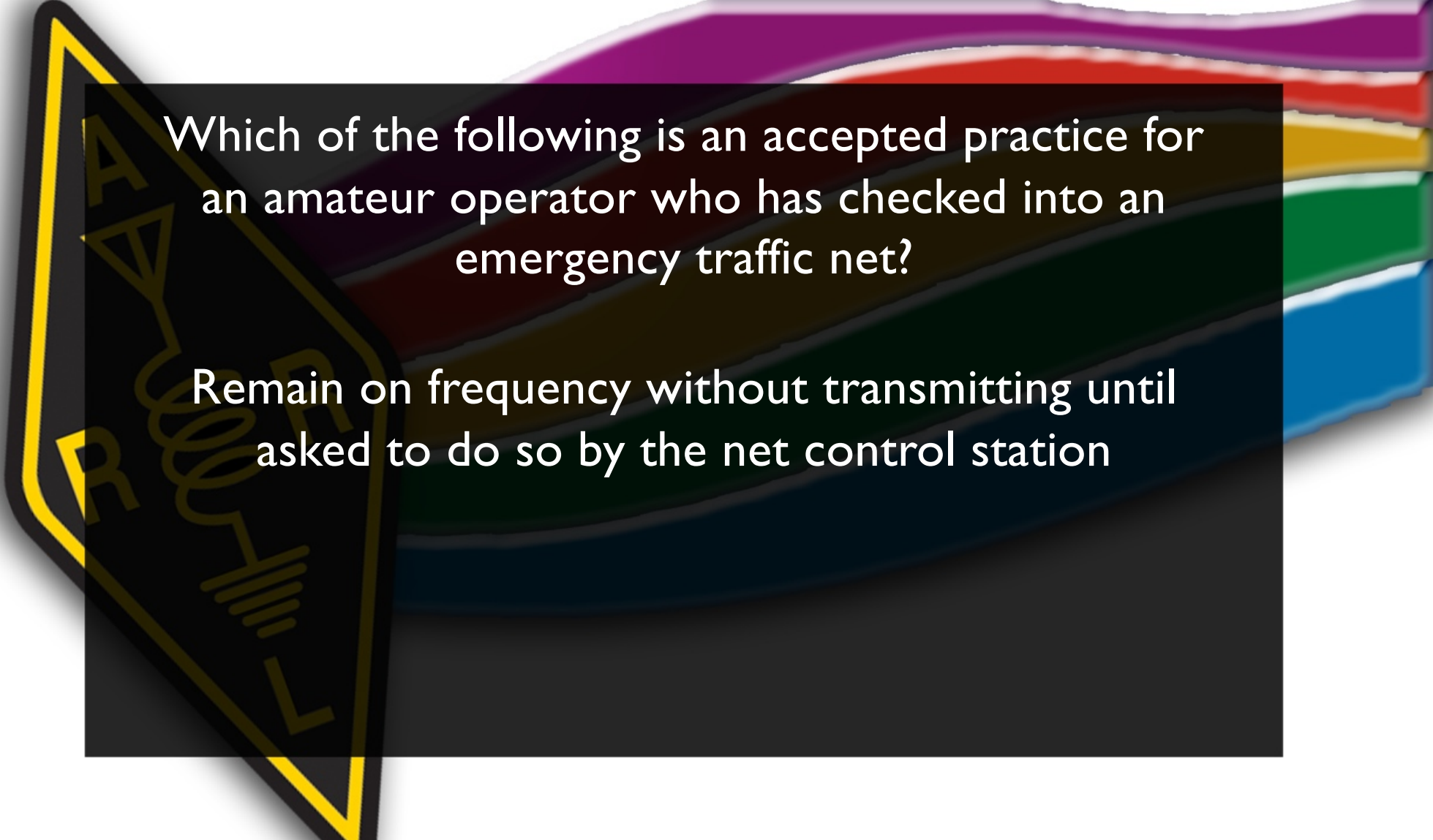


Which of the following is an accepted practice to get the immediate attention of a net control station when reporting an emergency?

Begin your transmission with “Priority” or “Emergency” followed by your call sign



Which of the following is an accepted practice for an amateur operator who has checked into an emergency traffic net?



Which of the following is an accepted practice for an amateur operator who has checked into an emergency traffic net?

Remain on frequency without transmitting until asked to do so by the net control station




What is a characteristic of good emergency traffic handling?




What is a characteristic of good emergency traffic handling?

Passing messages exactly as received




Are amateur station control operators ever permitted to operate outside the frequency privileges of their license class?



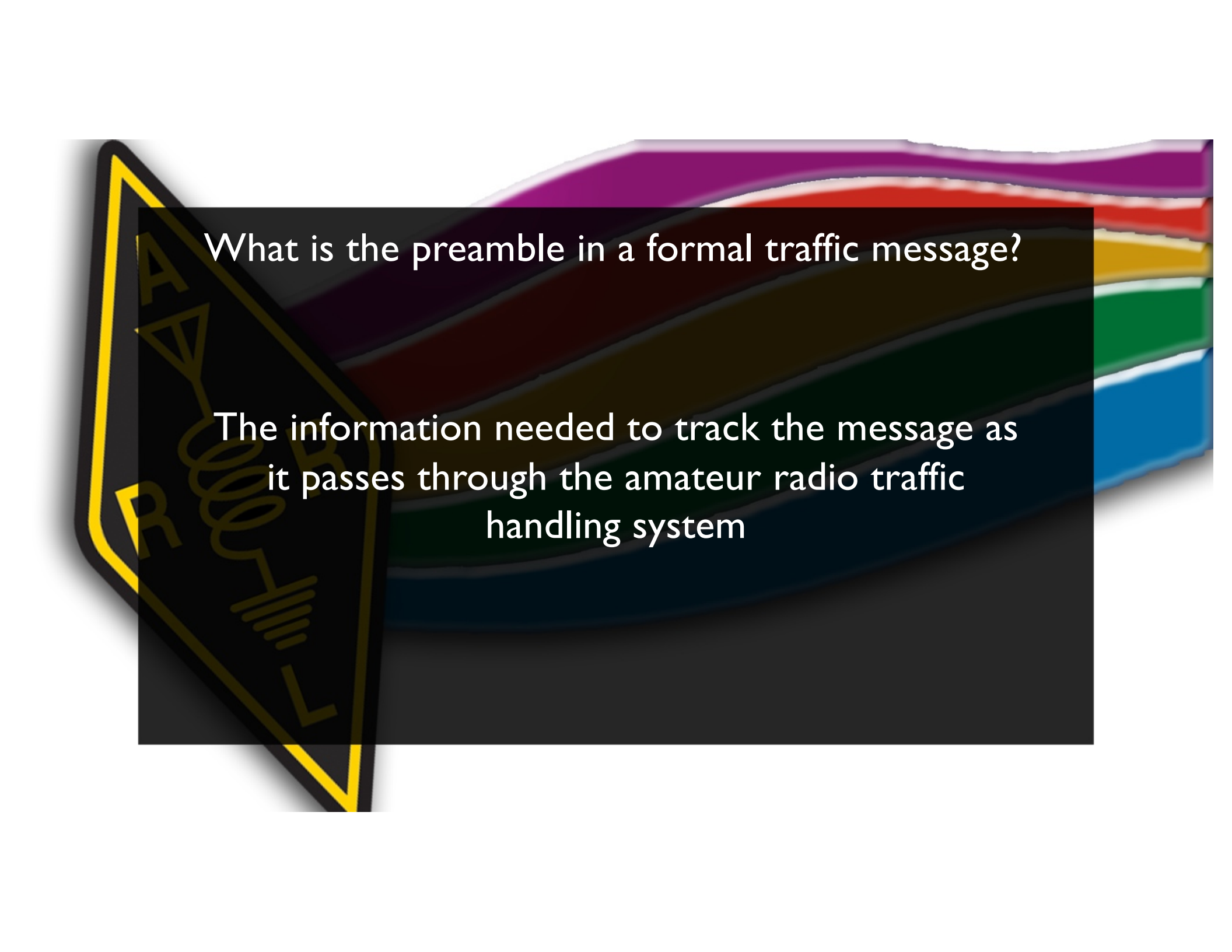
Are amateur station control operators ever permitted to operate outside the frequency privileges of their license class?

Yes, but only if necessary in situations involving the immediate safety of human life or protection of property





What is the preamble in a formal traffic message?



What is the preamble in a formal traffic message?

The information needed to track the message as it passes through the amateur radio traffic handling system

A stack of colorful papers in shades of purple, red, yellow, green, and blue. A dark grey rectangular overlay is positioned in the center, containing a white question. To the left of the overlay is a yellow diamond-shaped sign with a black border and a black background, featuring a white squiggly line and the letters 'A', 'R', and 'R' in white.

What is meant by the term "check" in reference to a formal traffic message?



What is meant by the term "check" in reference to a formal traffic message?

The check is a count of the number of words or word equivalents in the text portion of the message


What is the Amateur Radio Emergency Service (ARES)?



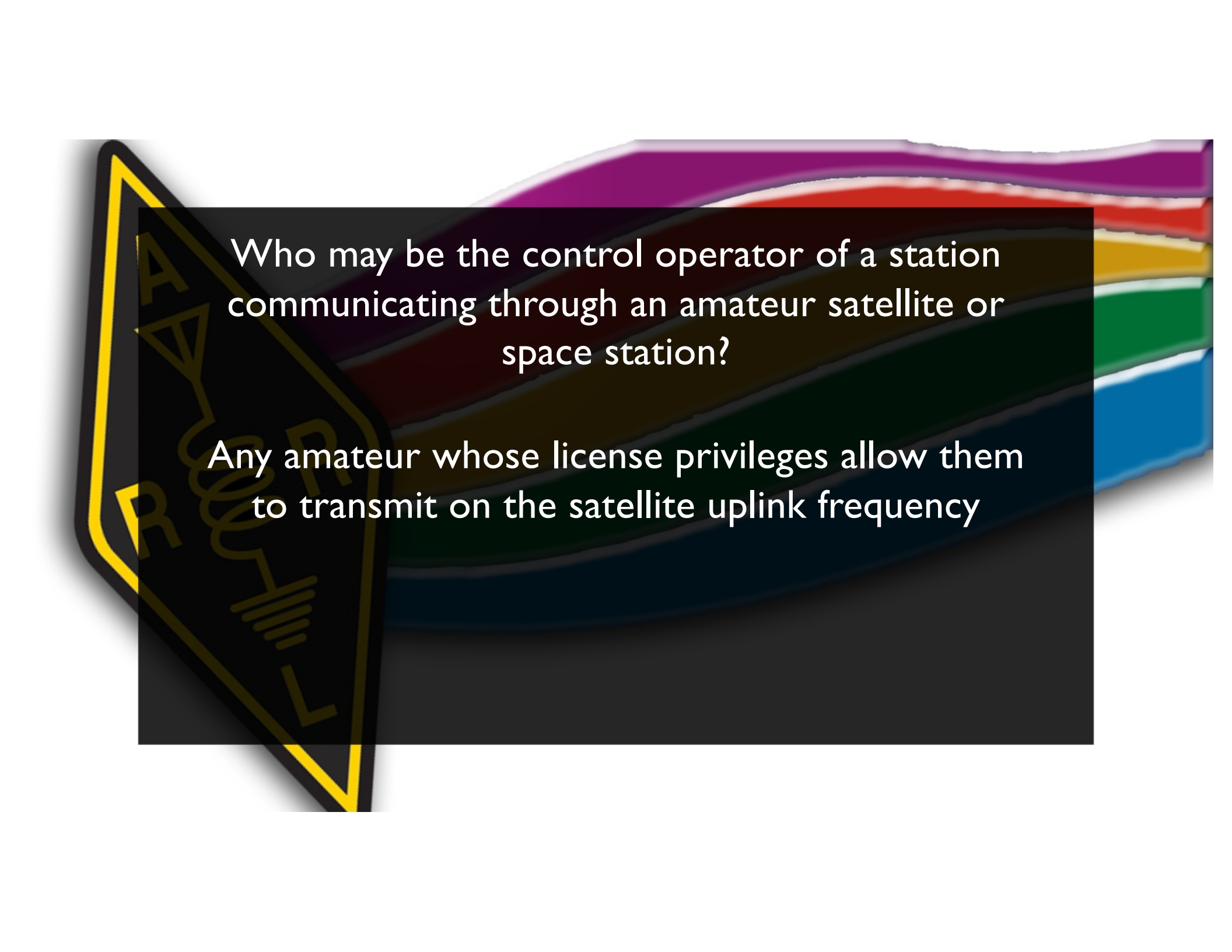


## What is the Amateur Radio Emergency Service (ARES)?

Licensed amateurs who have voluntarily registered their qualifications and equipment for communications duty in the public service



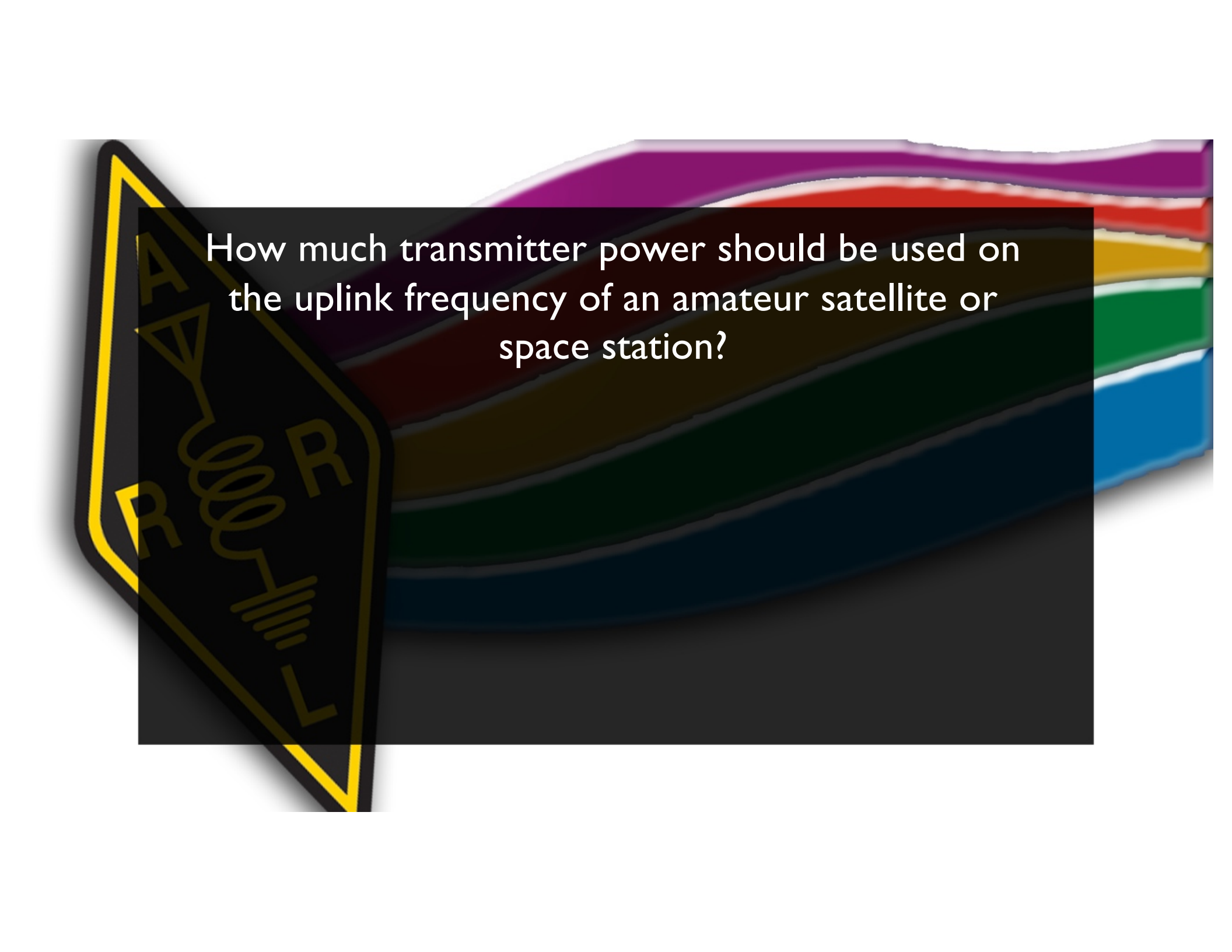
Who may be the control operator of a station communicating through an amateur satellite or space station?



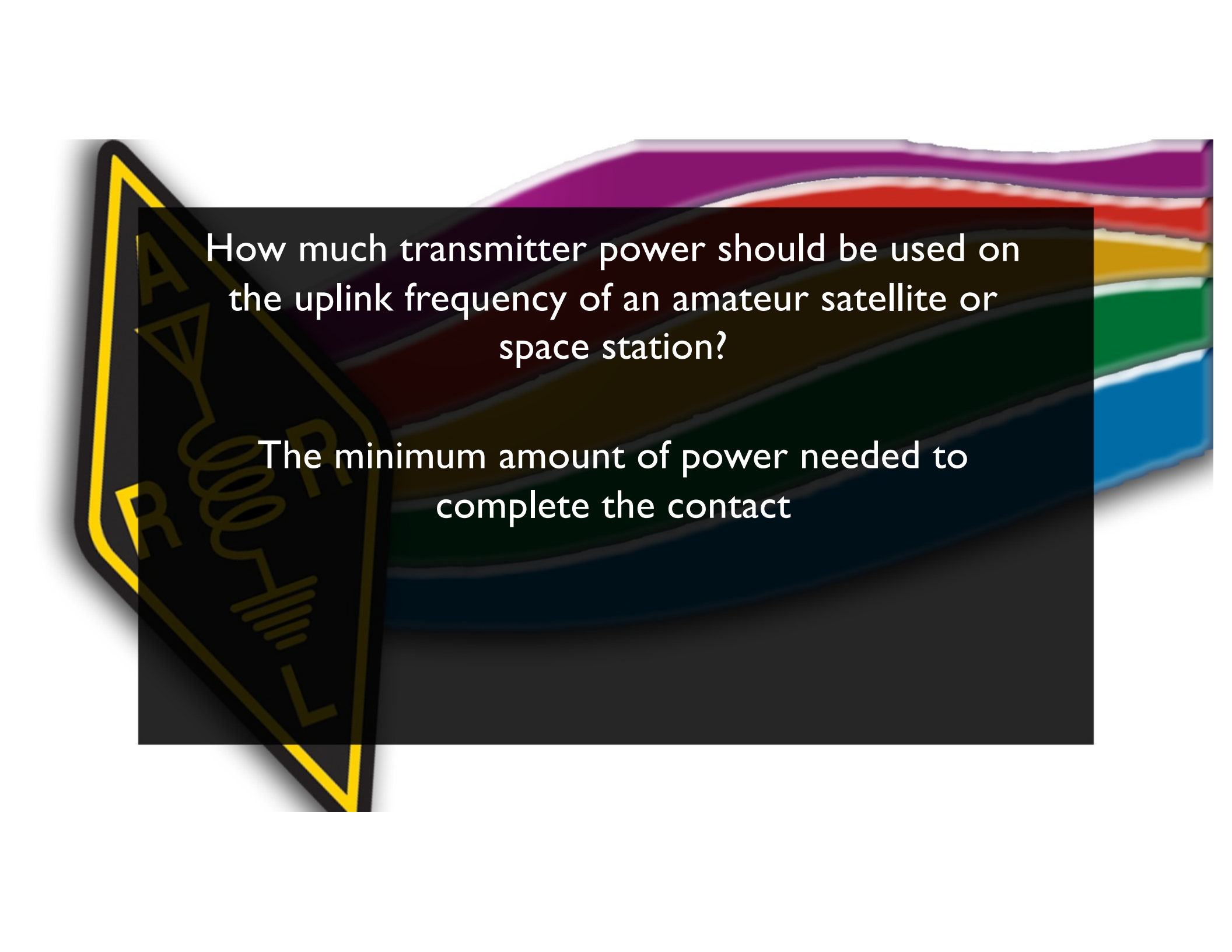
Who may be the control operator of a station communicating through an amateur satellite or space station?

Any amateur whose license privileges allow them to transmit on the satellite uplink frequency





How much transmitter power should be used on the uplink frequency of an amateur satellite or space station?



How much transmitter power should be used on the uplink frequency of an amateur satellite or space station?

The minimum amount of power needed to complete the contact



What is provided by satellite tracking programs?

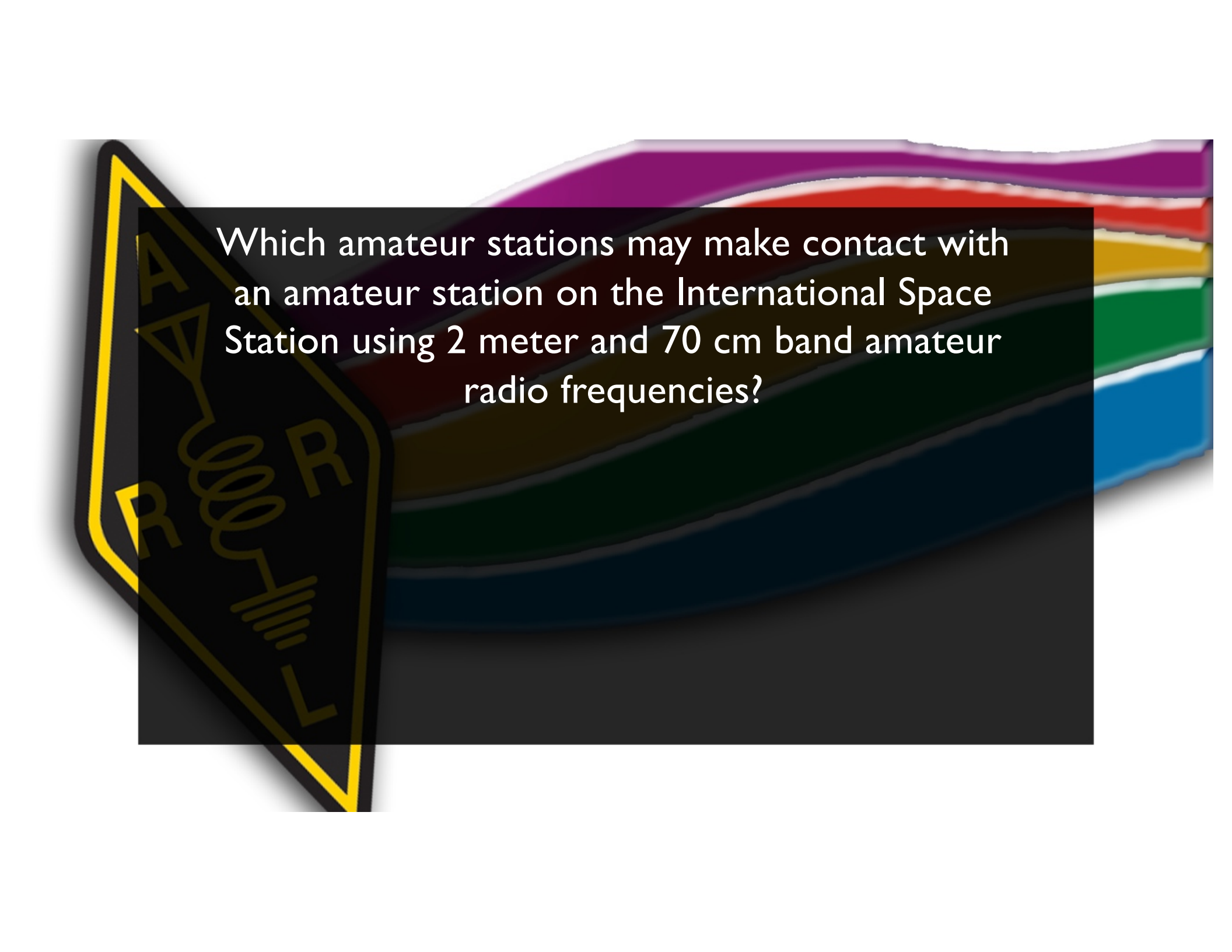


What is provided by satellite tracking programs?

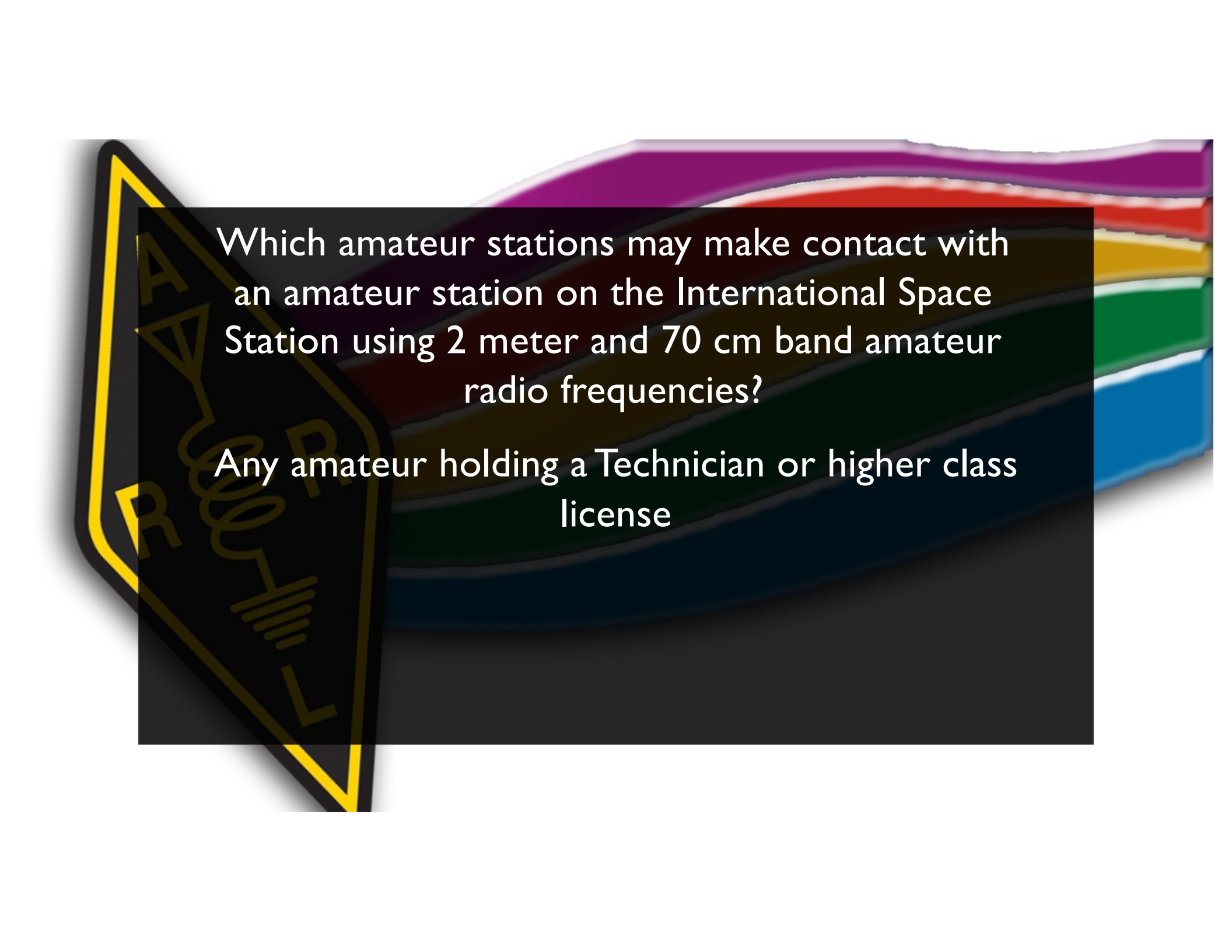
Maps showing the real-time position of the satellite track over the earth

The time, azimuth, and elevation of the start, maximum altitude, and end of a pass

The apparent frequency of the satellite transmission, including effects of Doppler shift



Which amateur stations may make contact with an amateur station on the International Space Station using 2 meter and 70 cm band amateur radio frequencies?



Which amateur stations may make contact with an amateur station on the International Space Station using 2 meter and 70 cm band amateur radio frequencies?

Any amateur holding a Technician or higher class license

What is a satellite beacon?






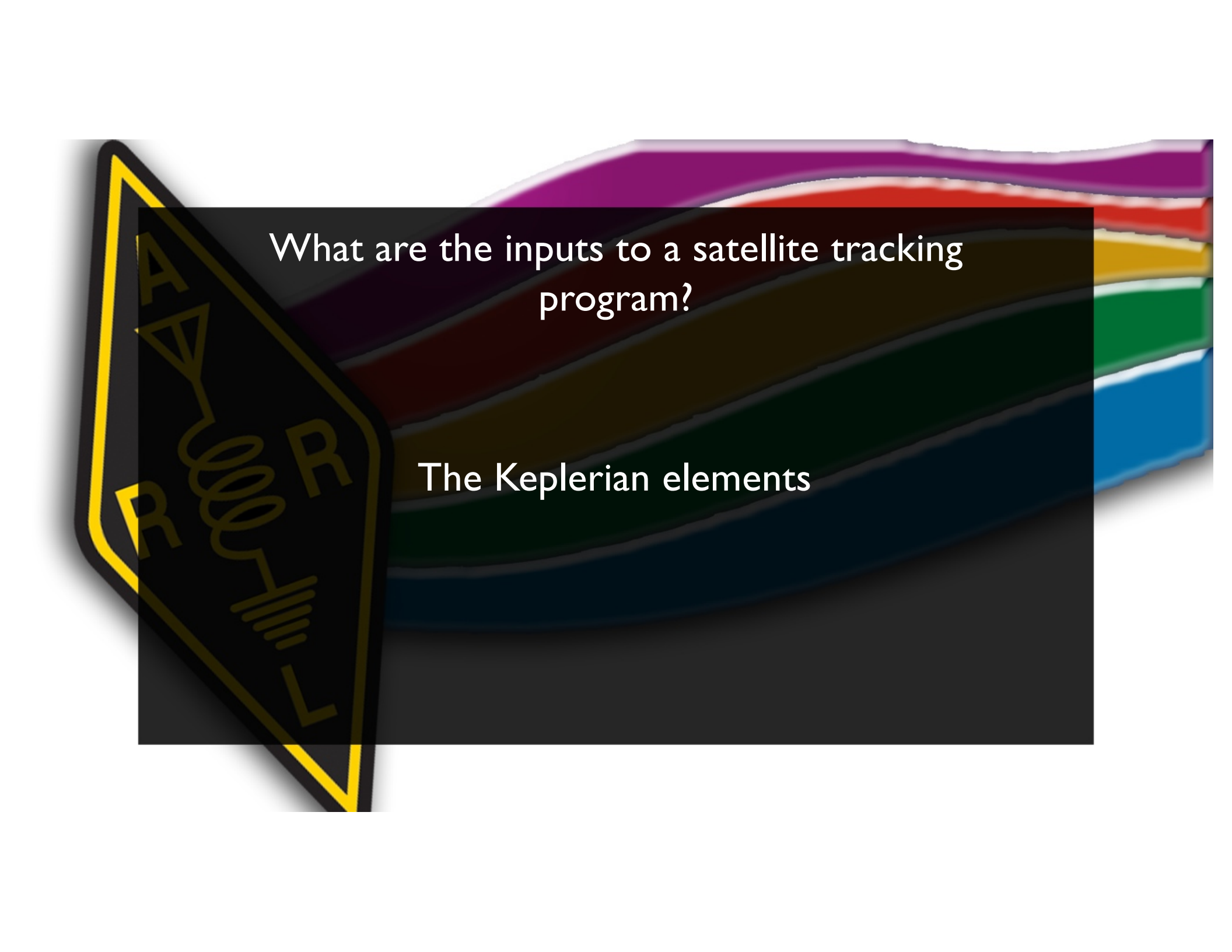
What is a satellite beacon?

A transmission from a space station that contains information about a satellite






What are the inputs to a satellite tracking program?

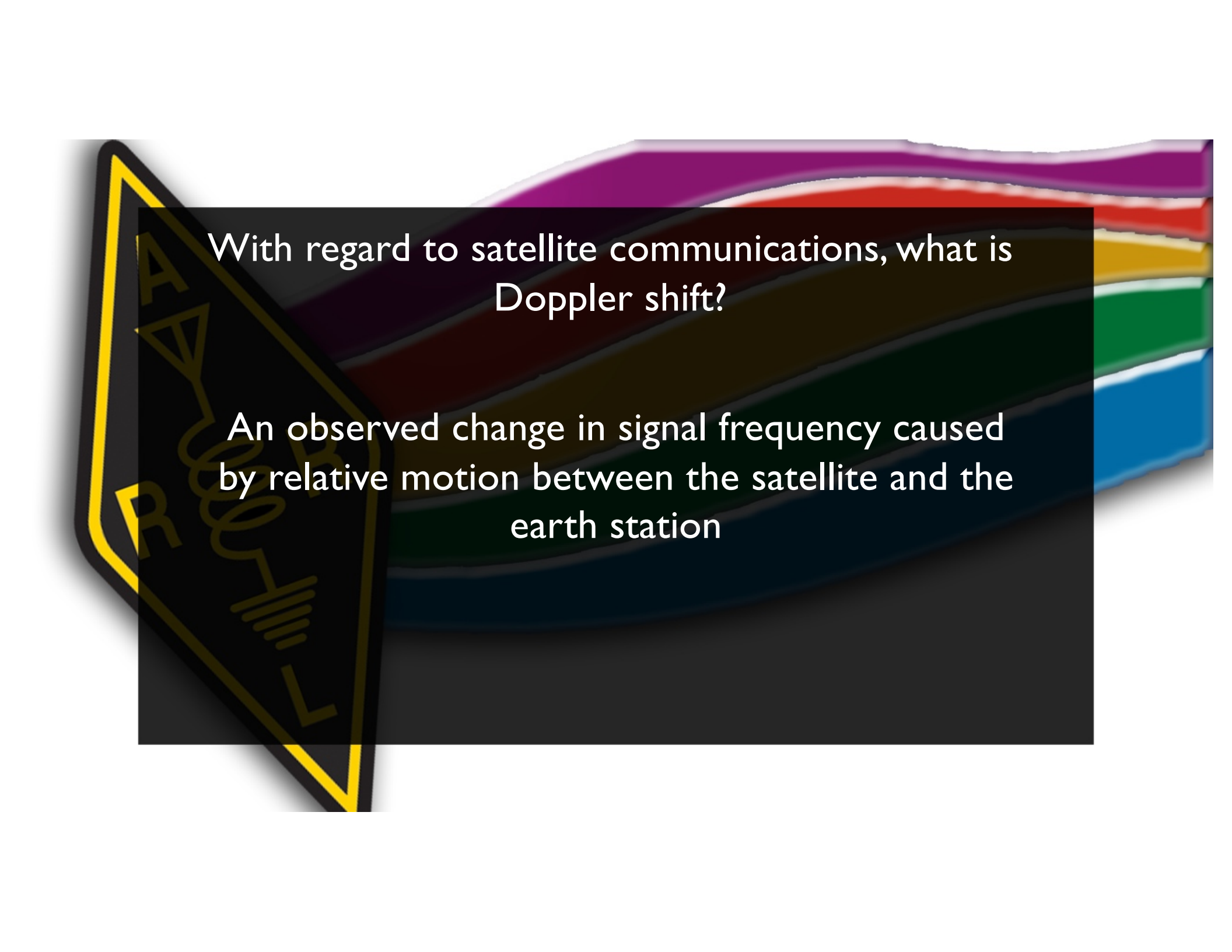


What are the inputs to a satellite tracking program?

The Keplerian elements

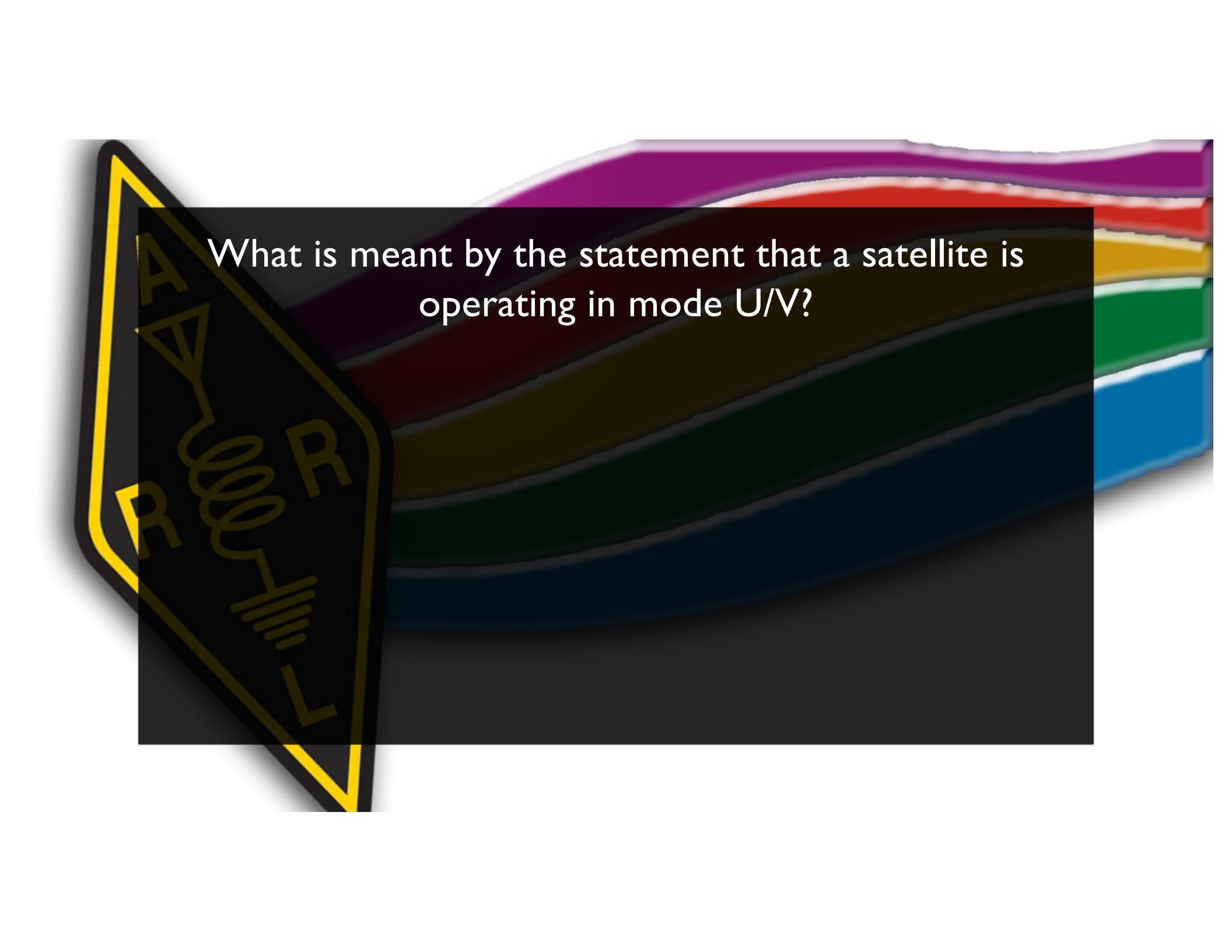


With regard to satellite communications, what is Doppler shift?

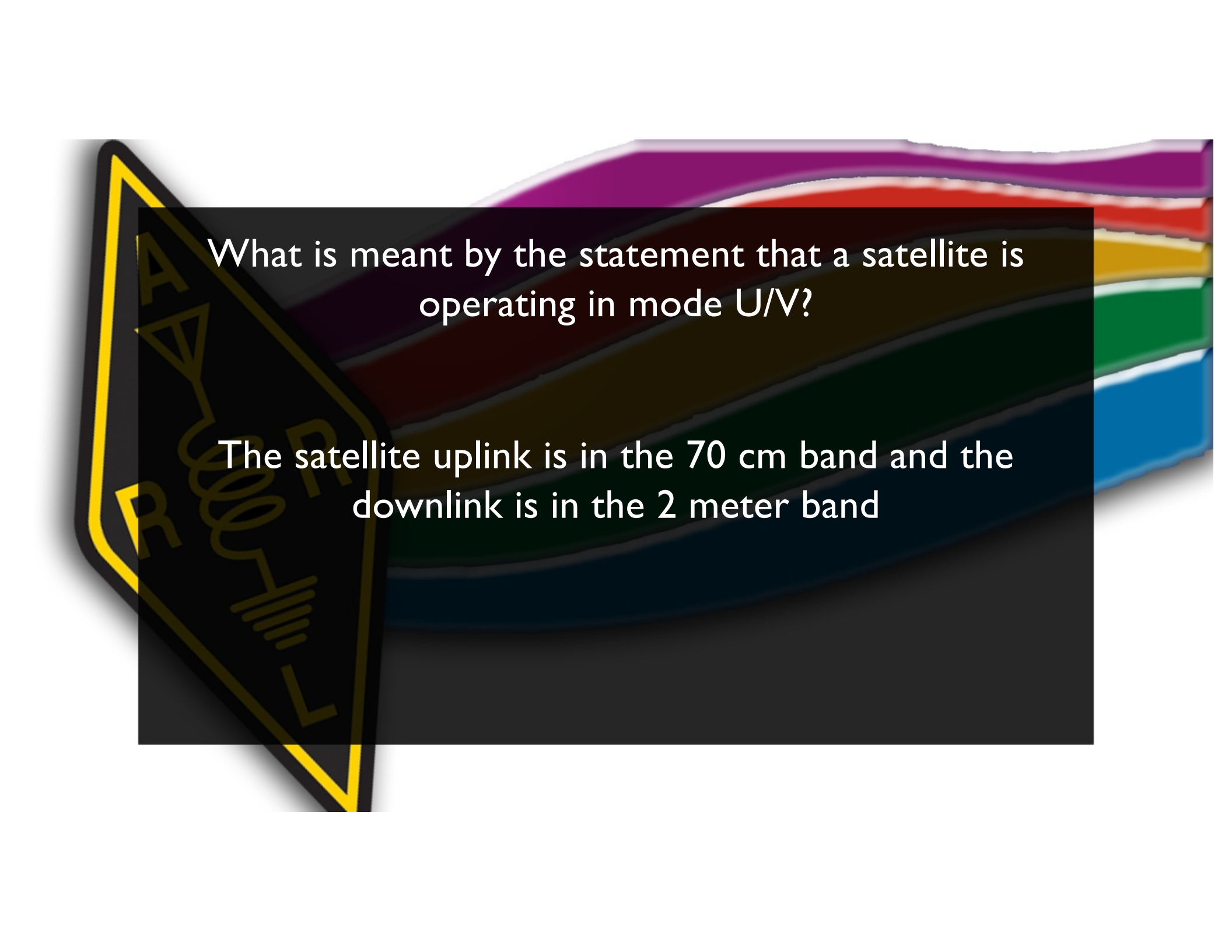


With regard to satellite communications, what is  
Doppler shift?

An observed change in signal frequency caused  
by relative motion between the satellite and the  
earth station



What is meant by the statement that a satellite is operating in mode U/V?



What is meant by the statement that a satellite is operating in mode U/V?

The satellite uplink is in the 70 cm band and the downlink is in the 2 meter band

The image features a background of horizontal, wavy rainbow-colored stripes. On the left side, there is a black, diamond-shaped graphic with a yellow border. Inside this graphic, there is a circuit diagram consisting of a coil of wire and a battery symbol. The letters 'A', 'R', and 'R' are placed around the circuit: 'A' is at the top left, 'R' is at the top right, and another 'R' is at the bottom right. A dark grey rectangular box is overlaid on the center of the image, containing white text.

What causes spin fading when referring to satellite signals?



What causes spin fading when referring to satellite signals?

Rotation of the satellite and its antennas






What do the initials LEO tell you about an amateur satellite?






What do the initials LEO tell you about an amateur satellite?

The satellite is in a Low Earth Orbit

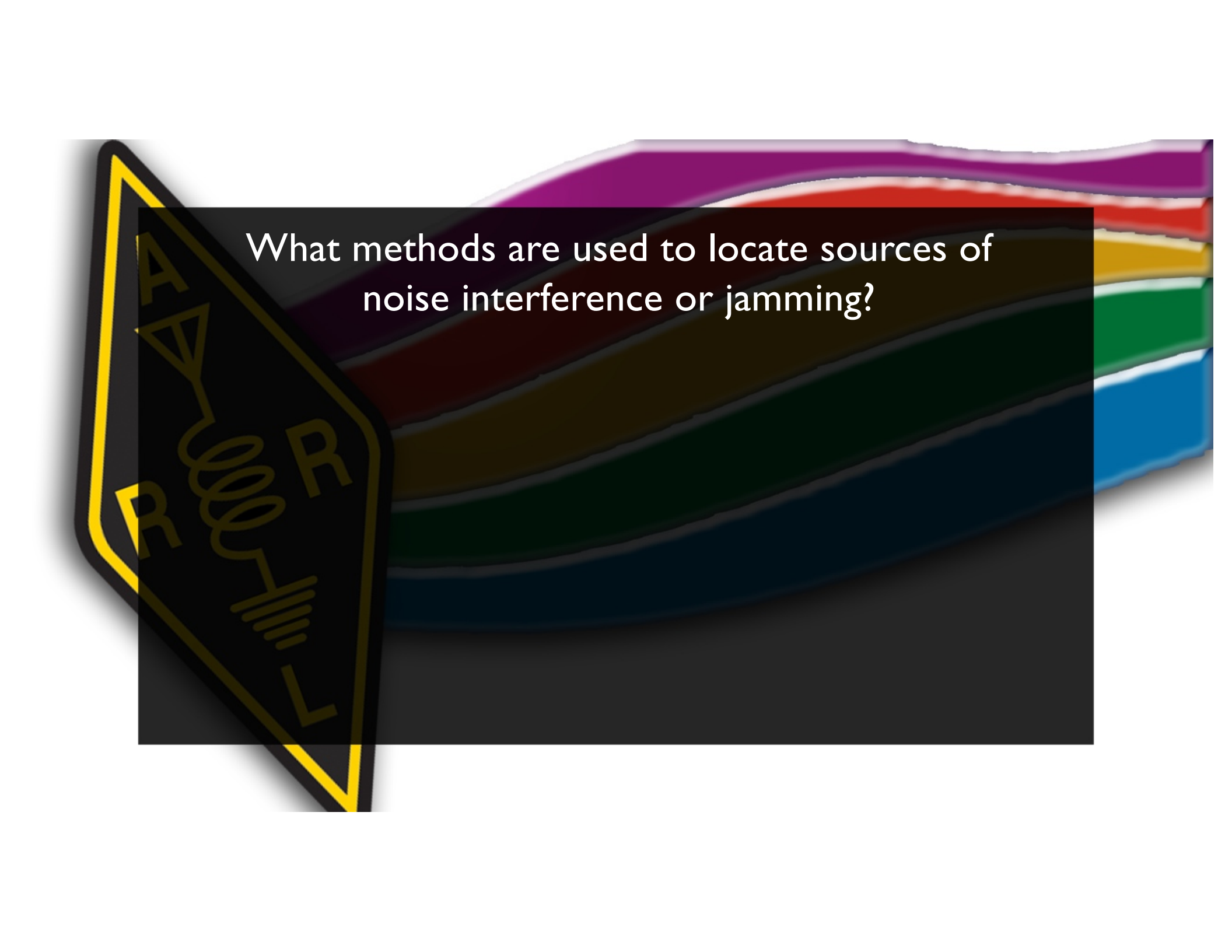
The image features a background of horizontal, wavy, multi-colored bands in shades of purple, red, orange, yellow, green, and blue. On the left side, there is a black, diamond-shaped icon with a yellow border. Inside the icon, there is a circuit diagram showing a battery at the bottom, a resistor labeled 'R', a coil labeled 'R', and a diode labeled 'R'.

What is a commonly used method of sending signals to and from a digital satellite?

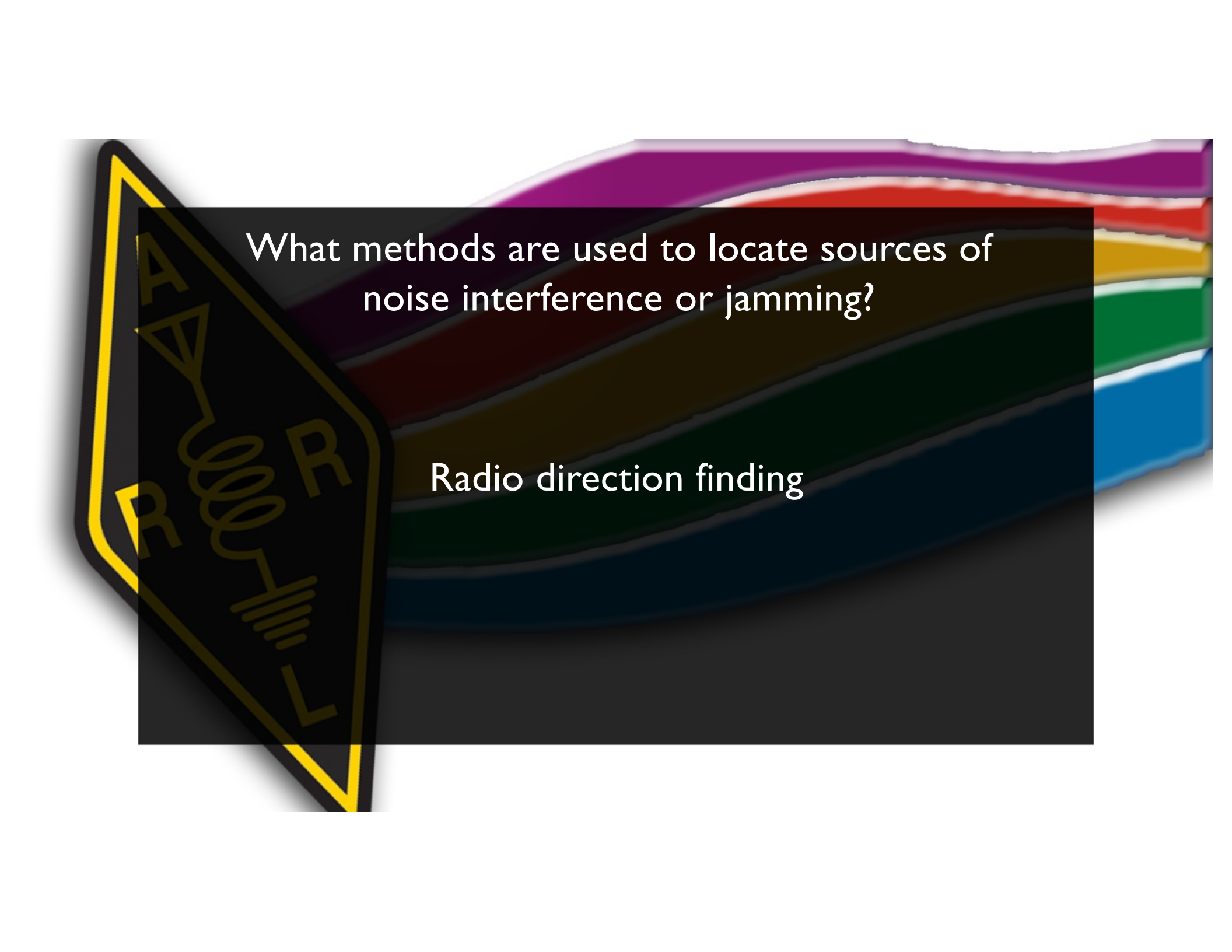


What is a commonly used method of sending signals to and from a digital satellite?

FM Packet




What methods are used to locate sources of noise interference or jamming?



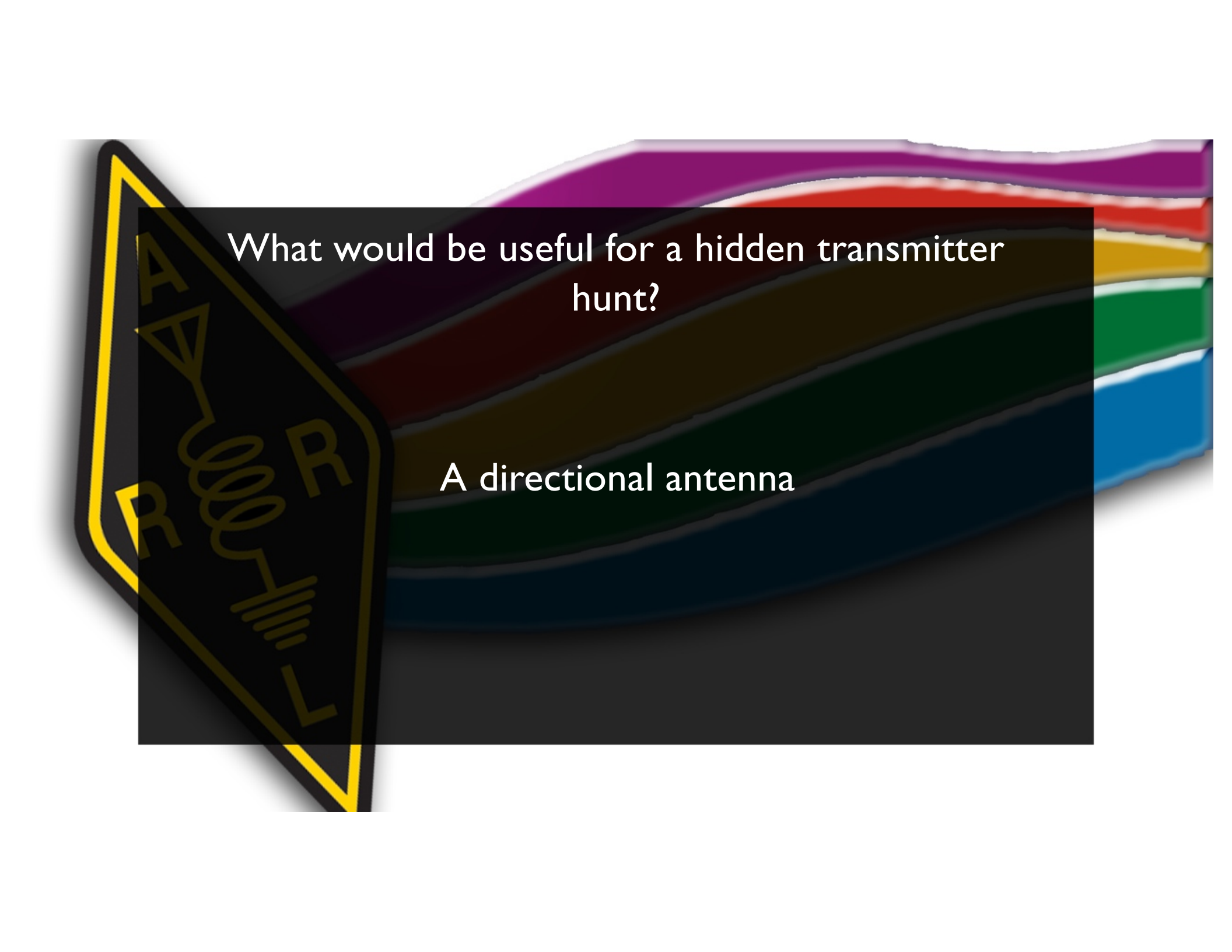
What methods are used to locate sources of noise interference or jamming?

Radio direction finding



What would be useful for a hidden transmitter hunt?





What would be useful for a hidden transmitter hunt?

A directional antenna








What popular operating activity involves contacting as many stations as possible during a specified period of time?



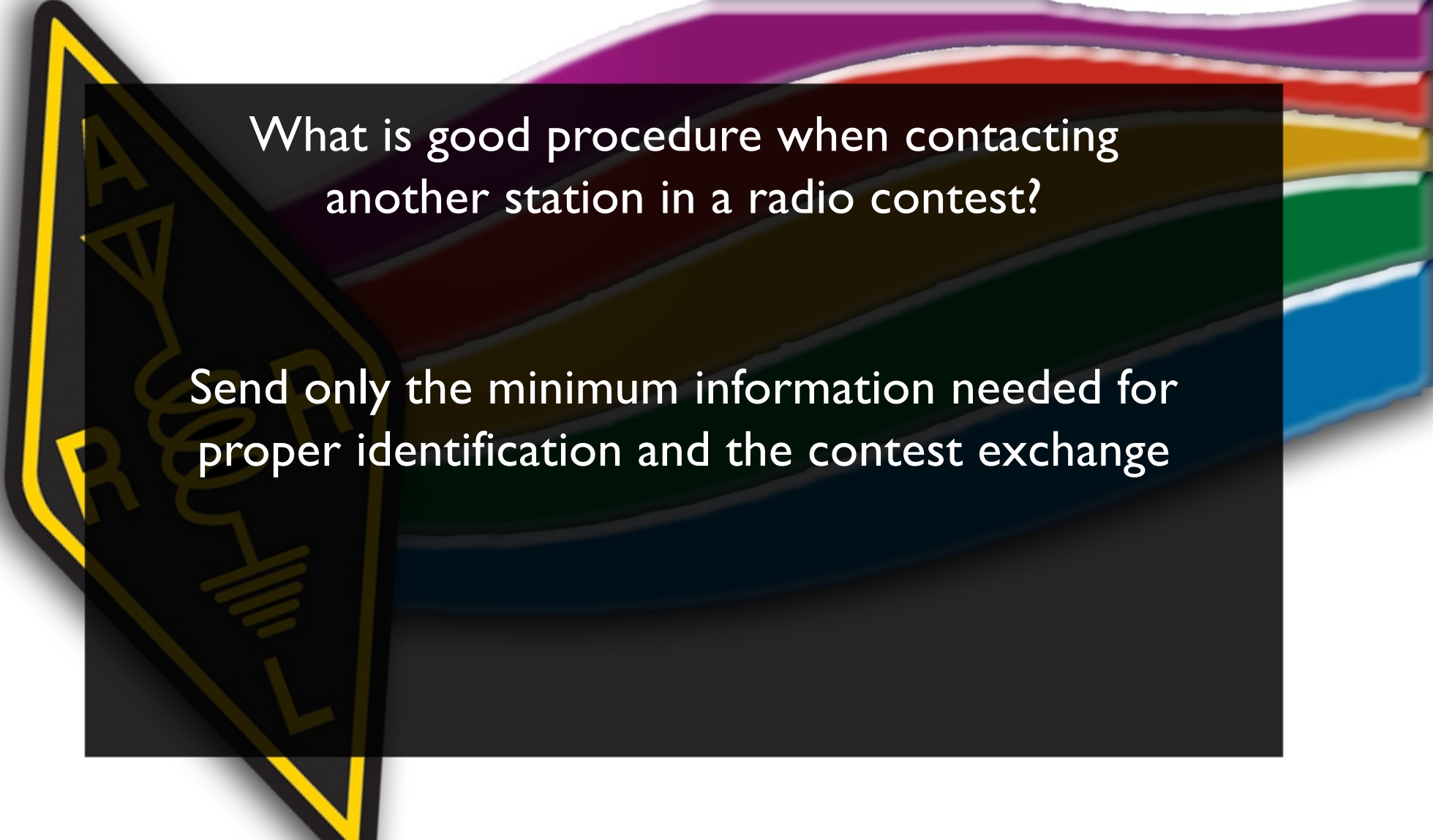


What popular operating activity involves contacting as many stations as possible during a specified period of time?

Contesting

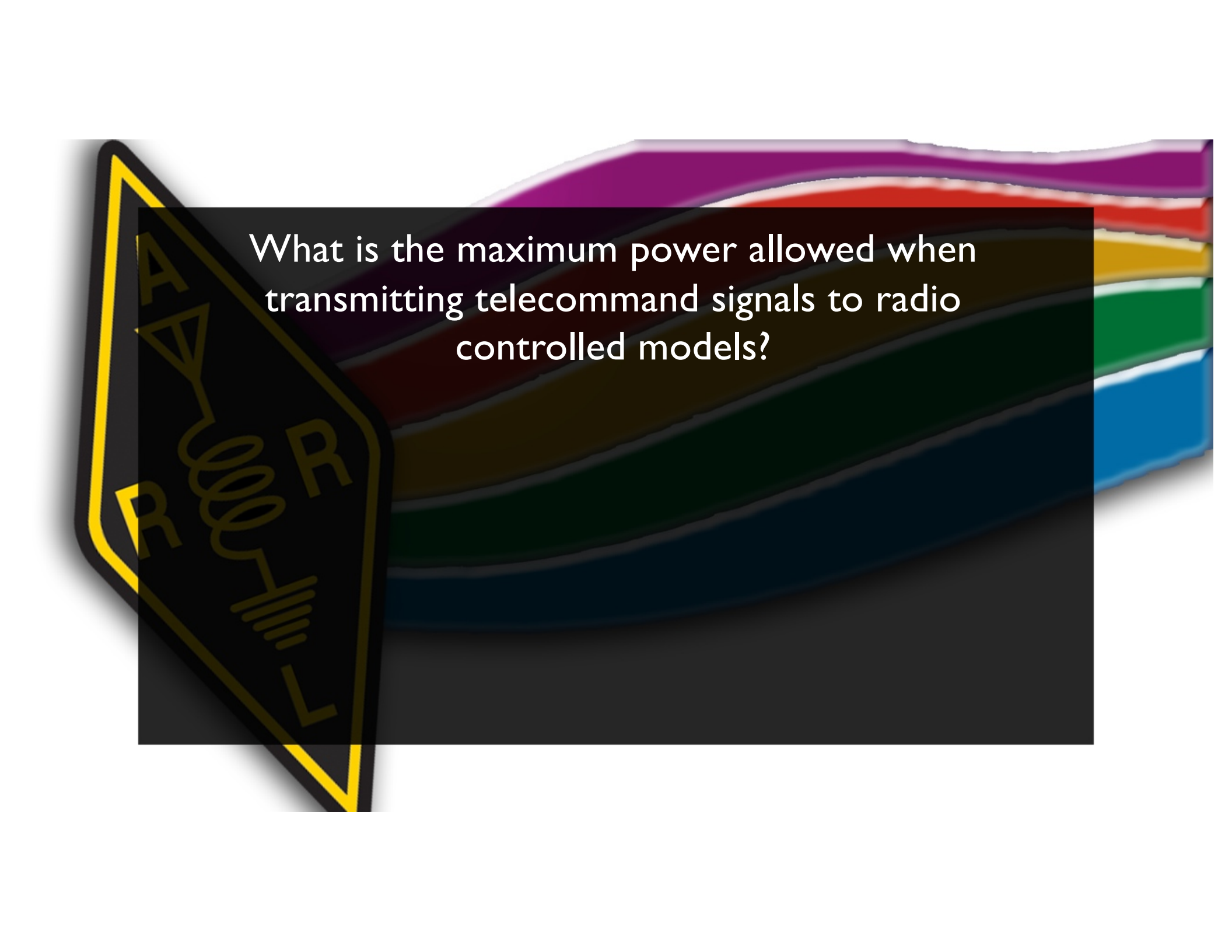


What is good procedure when contacting another station in a radio contest?

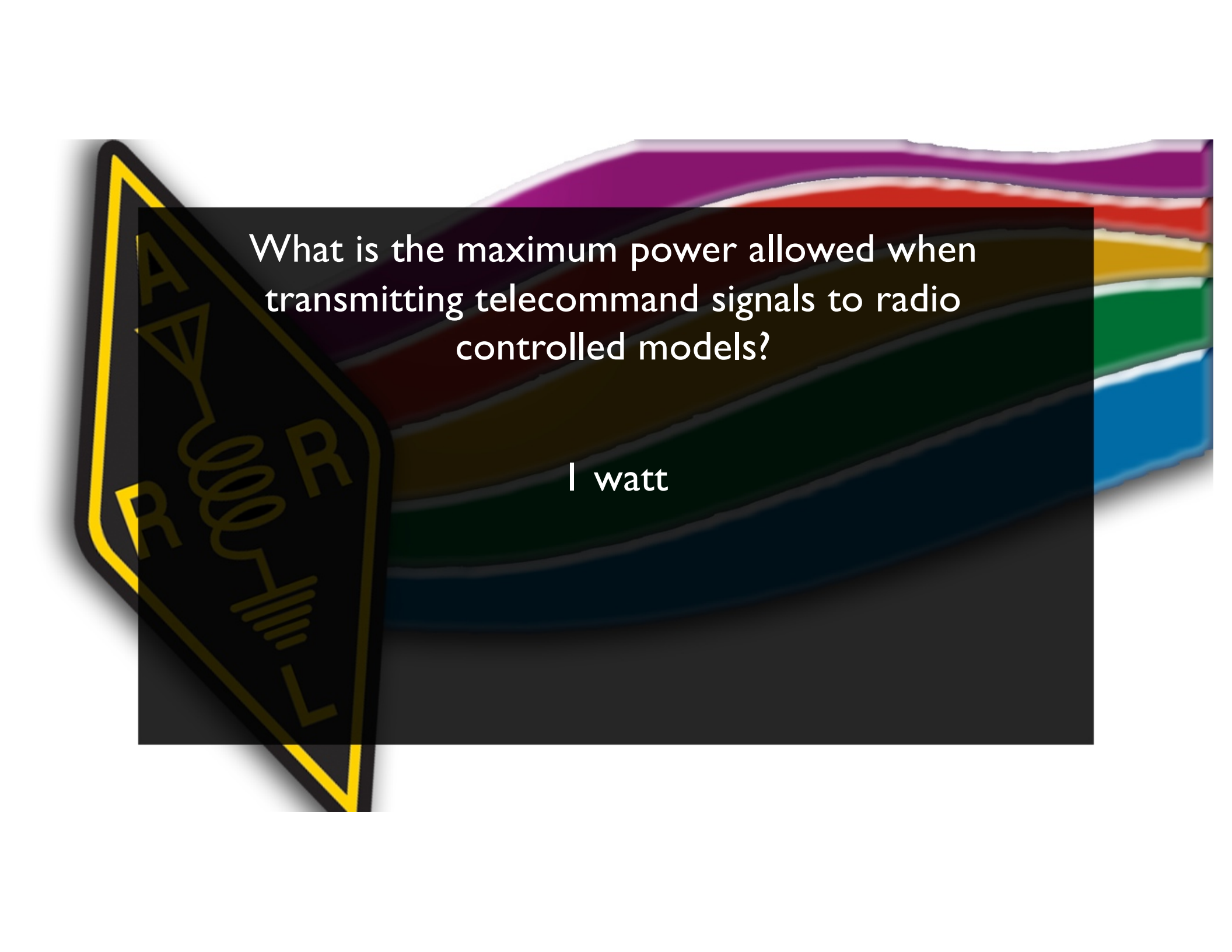


What is good procedure when contacting another station in a radio contest?

Send only the minimum information needed for proper identification and the contest exchange

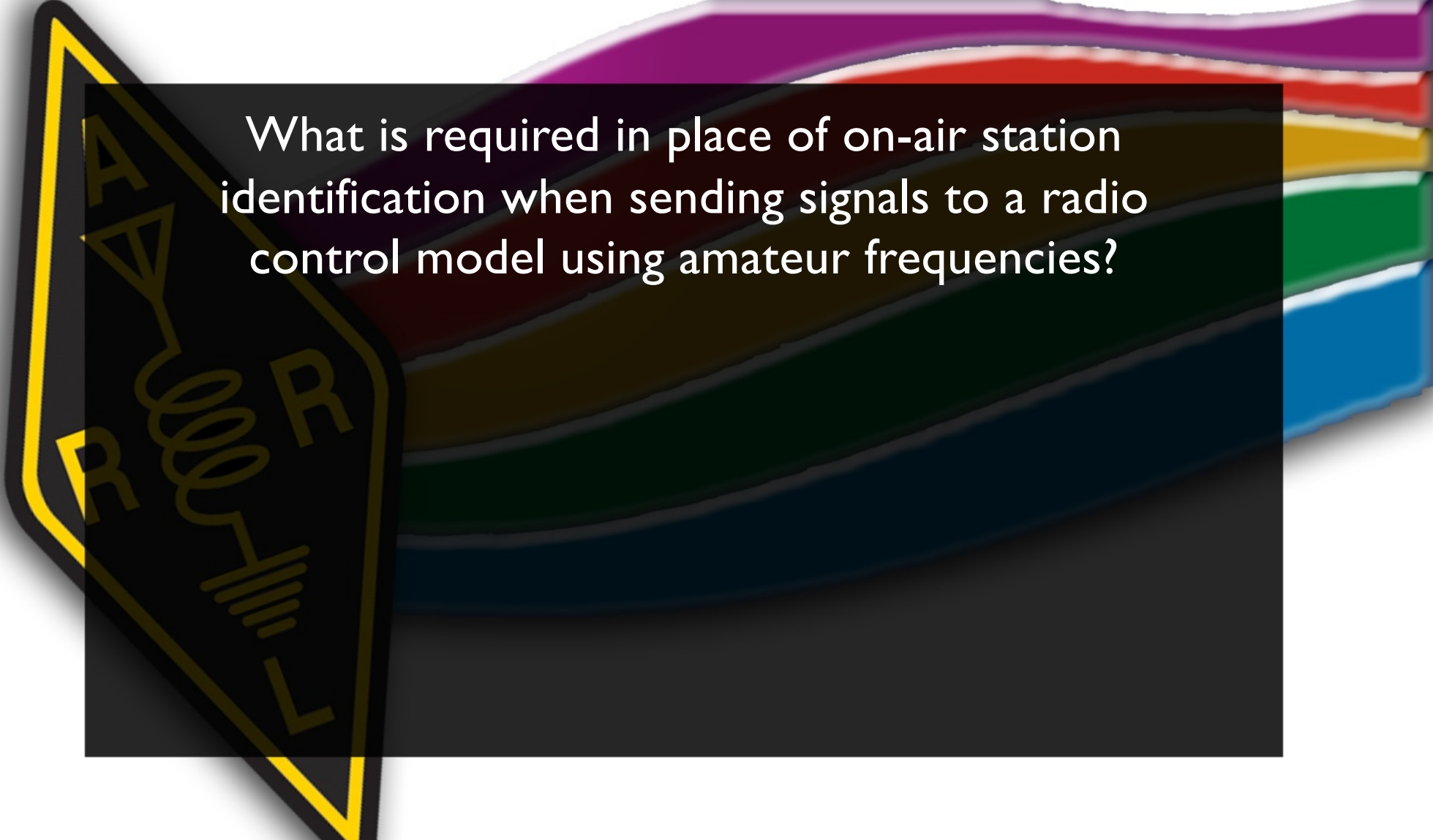


What is the maximum power allowed when transmitting telecommand signals to radio controlled models?

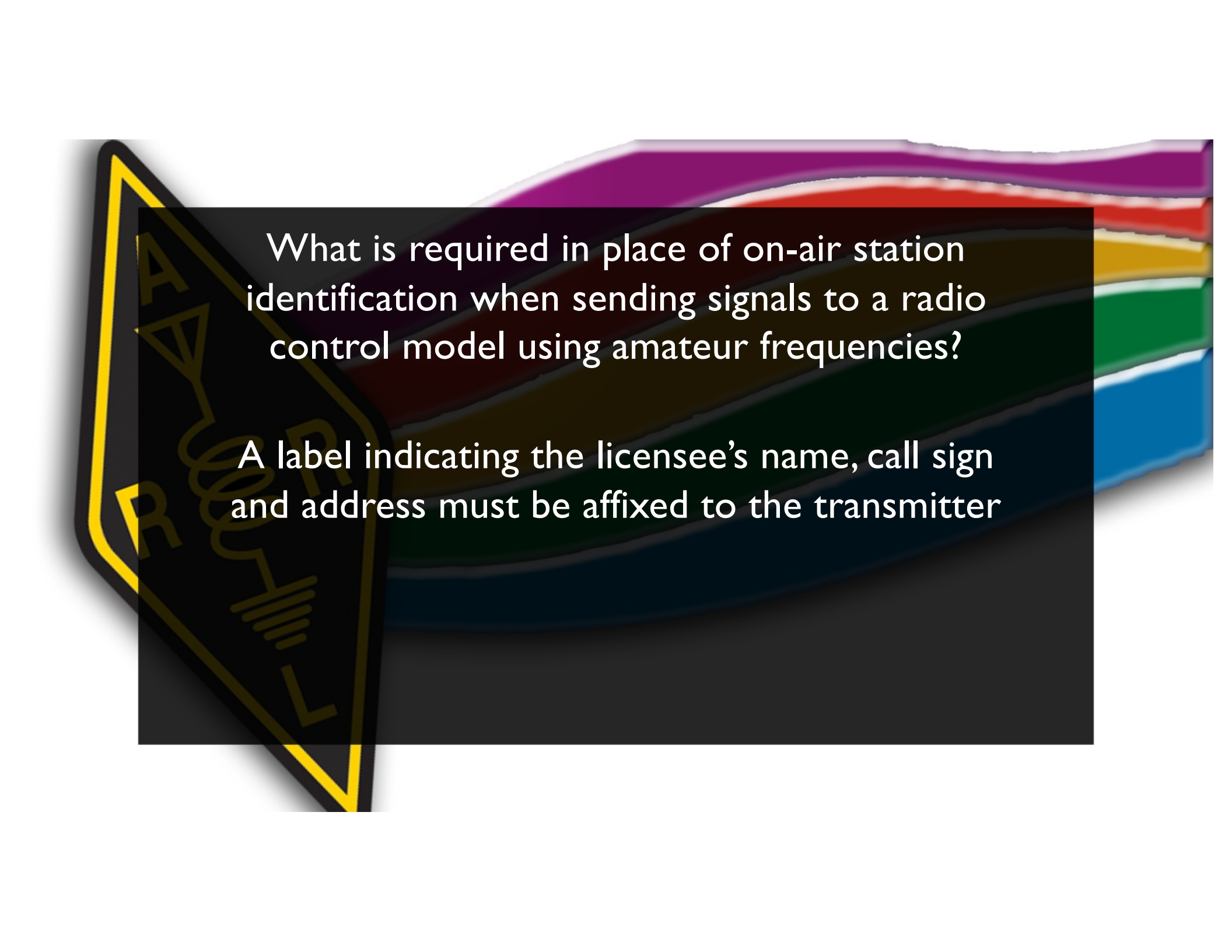


What is the maximum power allowed when transmitting telecommand signals to radio controlled models?

1 watt



What is required in place of on-air station identification when sending signals to a radio control model using amateur frequencies?



What is required in place of on-air station identification when sending signals to a radio control model using amateur frequencies?

A label indicating the licensee's name, call sign and address must be affixed to the transmitter





What type of transmission is indicated by the term NTSC?





What type of transmission is indicated by the term NTSC?

An analog fast scan color TV signal



End of Module 14