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(54) **TACTICAL SURVEILLANCE SENSOR PROJECTILE SYSTEM**

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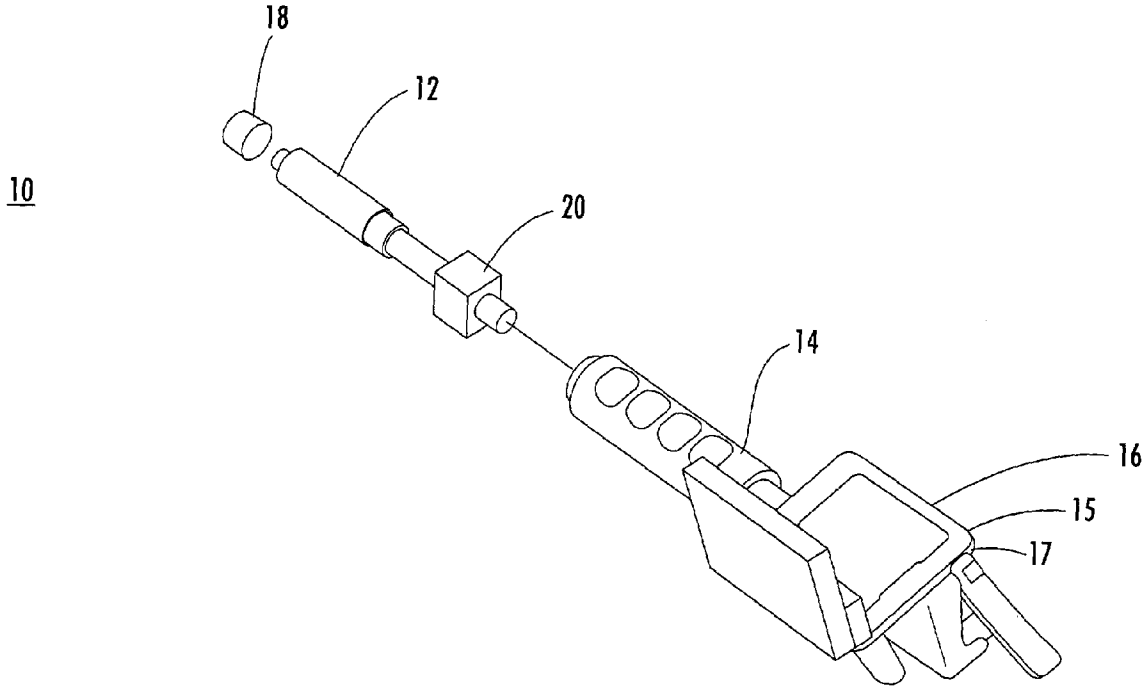
(57) **ABSTRACT**

A tactical surveillance sensor projectile system includes a propellant and primer chamber, a firing device, a sensor device, a signal processor, and a fiber optic cable; the firing device fires the primer and propellant to establish a powered phase of flight followed by a ballistic phase of flight to clear an obstacle; the sensor device generates surveillance signals representative of ambient characteristics beyond the obstacle at least during the ballistic phase of flight; the signal processor is responsive to the sensor device for converting the signals representative of ambient conditions to an optical data stream; and the fiber optic cable delivers the optical data stream to a ground station at least during the ballistic phase of flight.



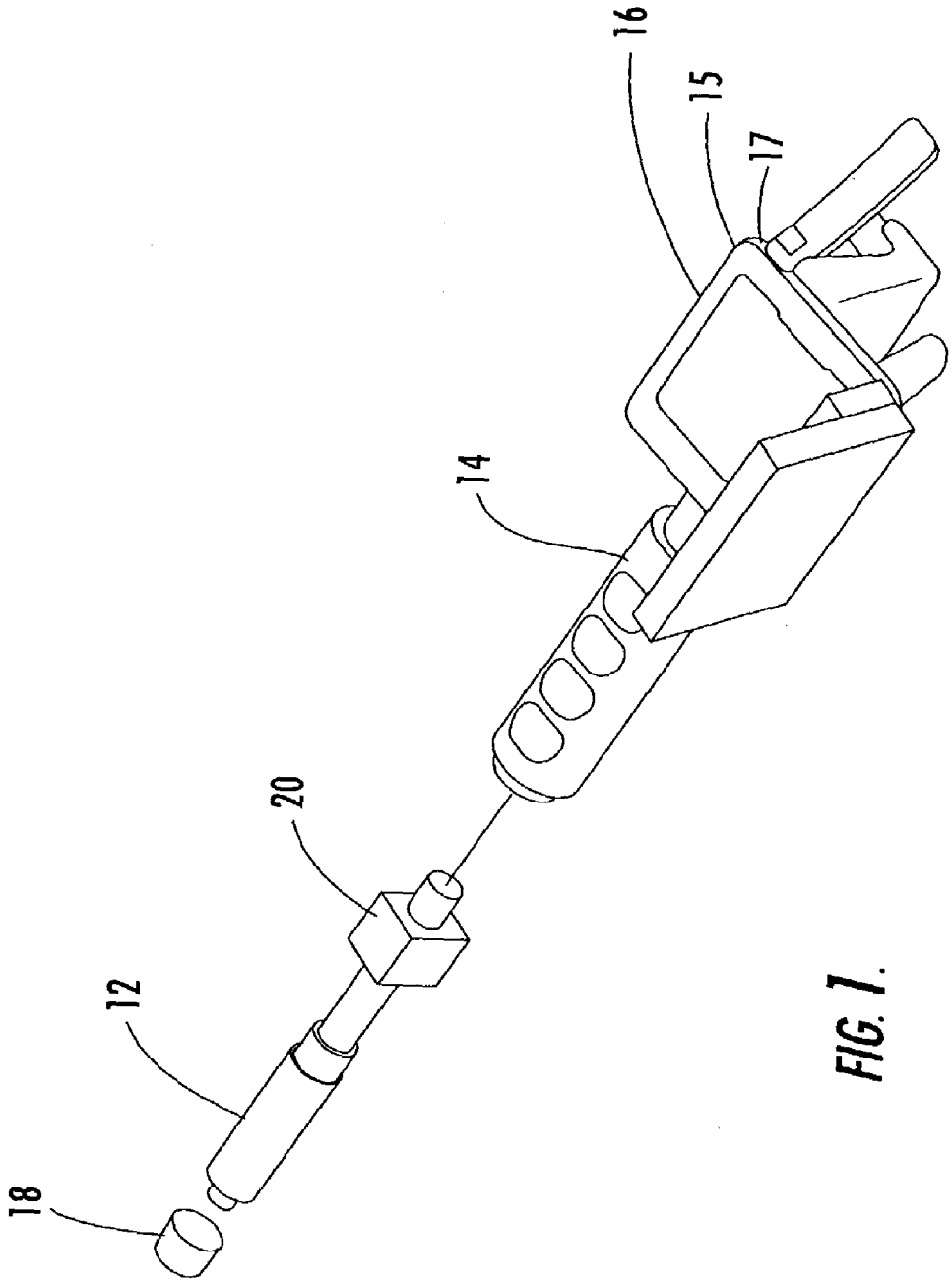


FIG. 1.

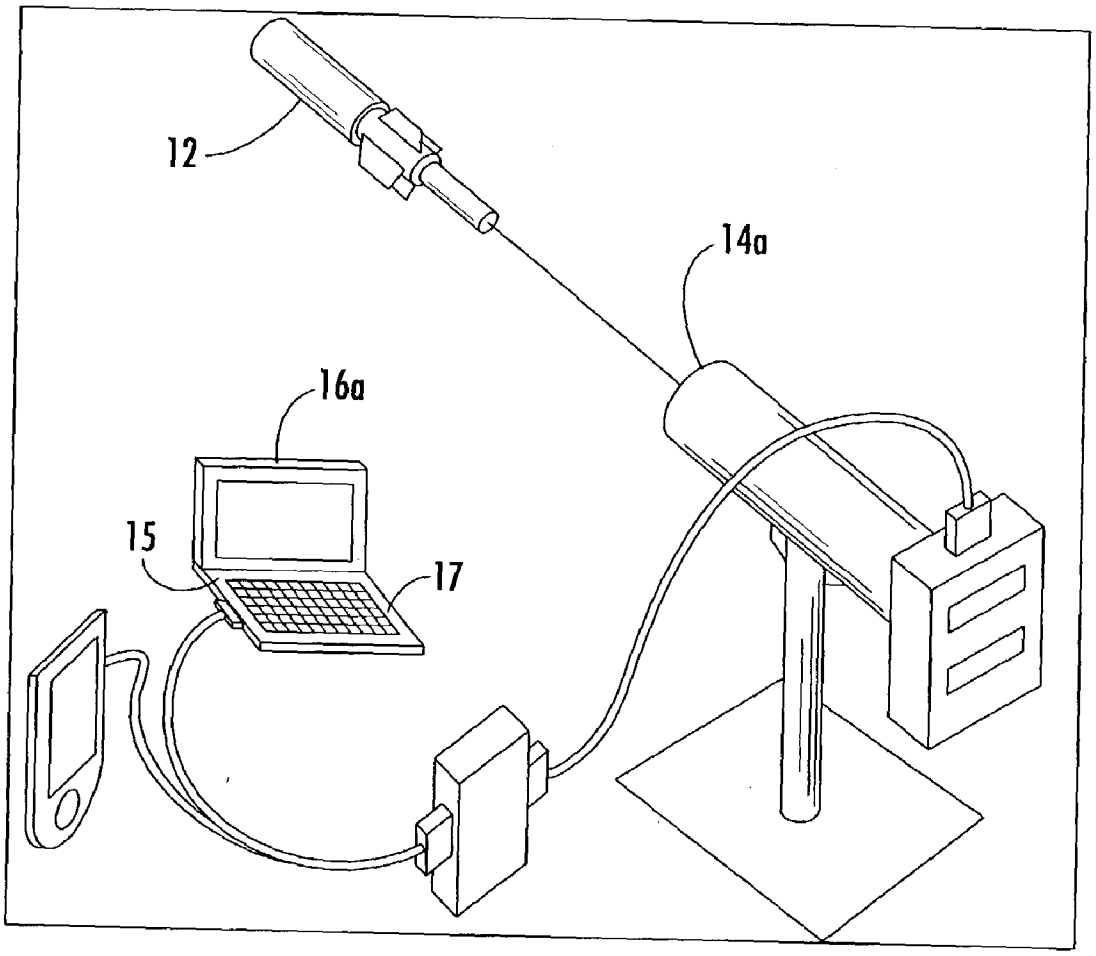


FIG. 2.

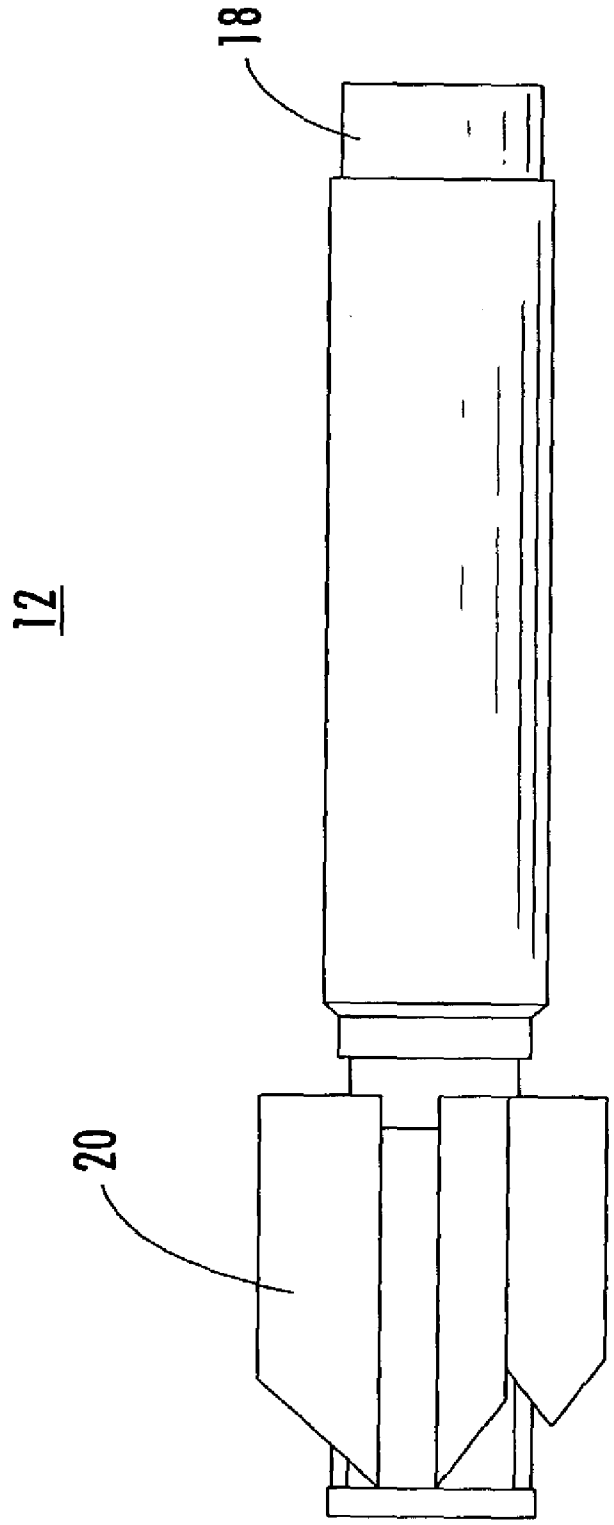


FIG. 3.

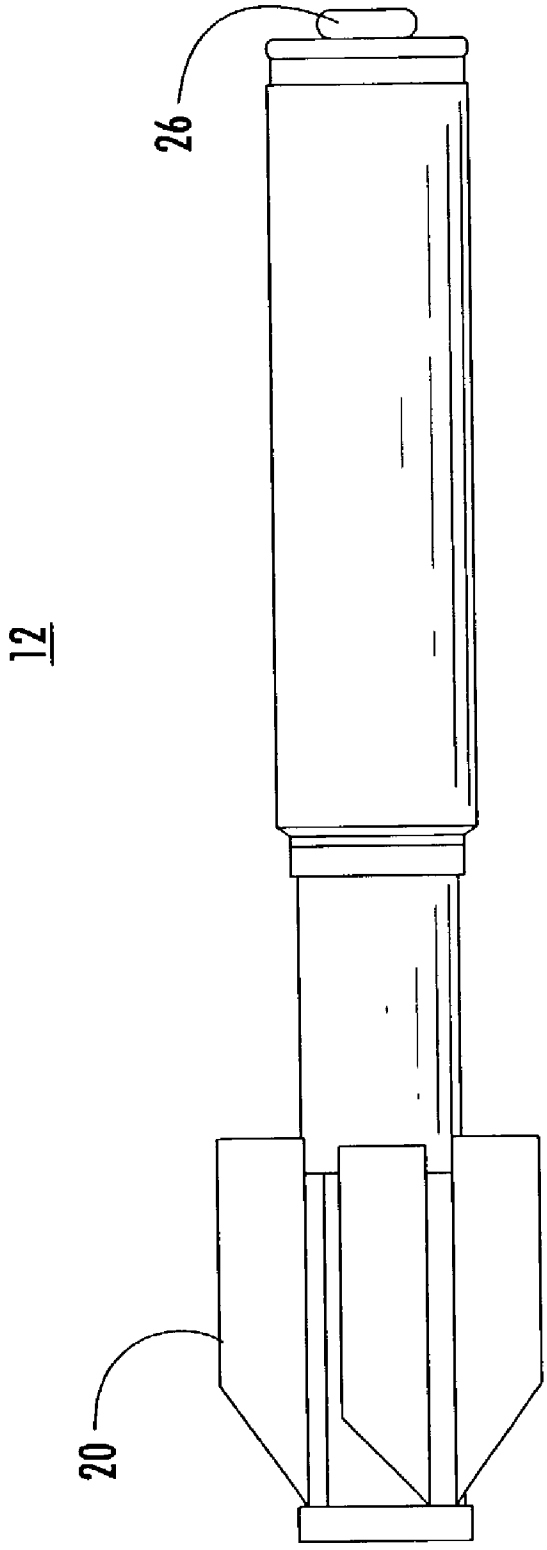


FIG. 4.

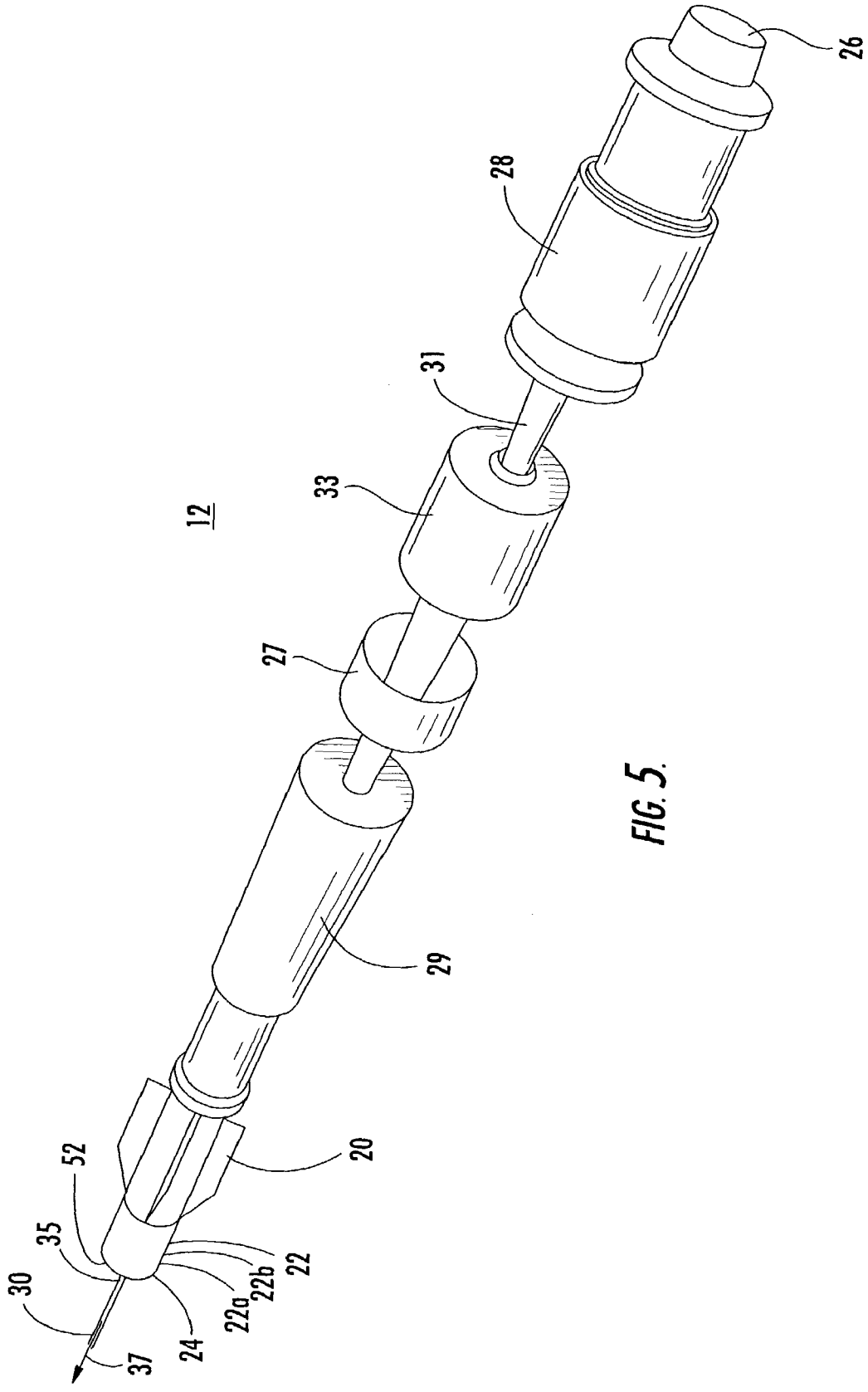


FIG. 5.

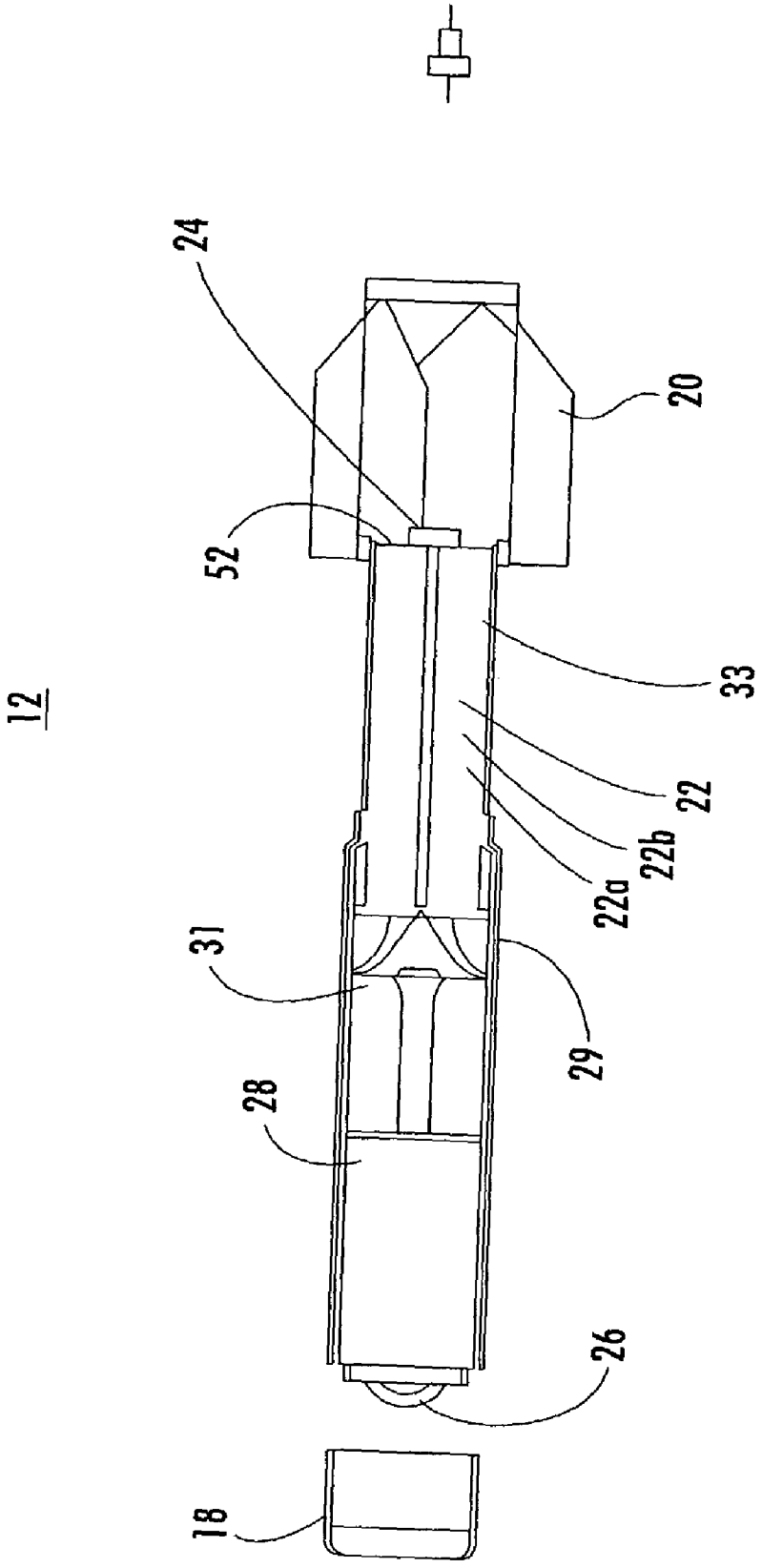


FIG. 6.

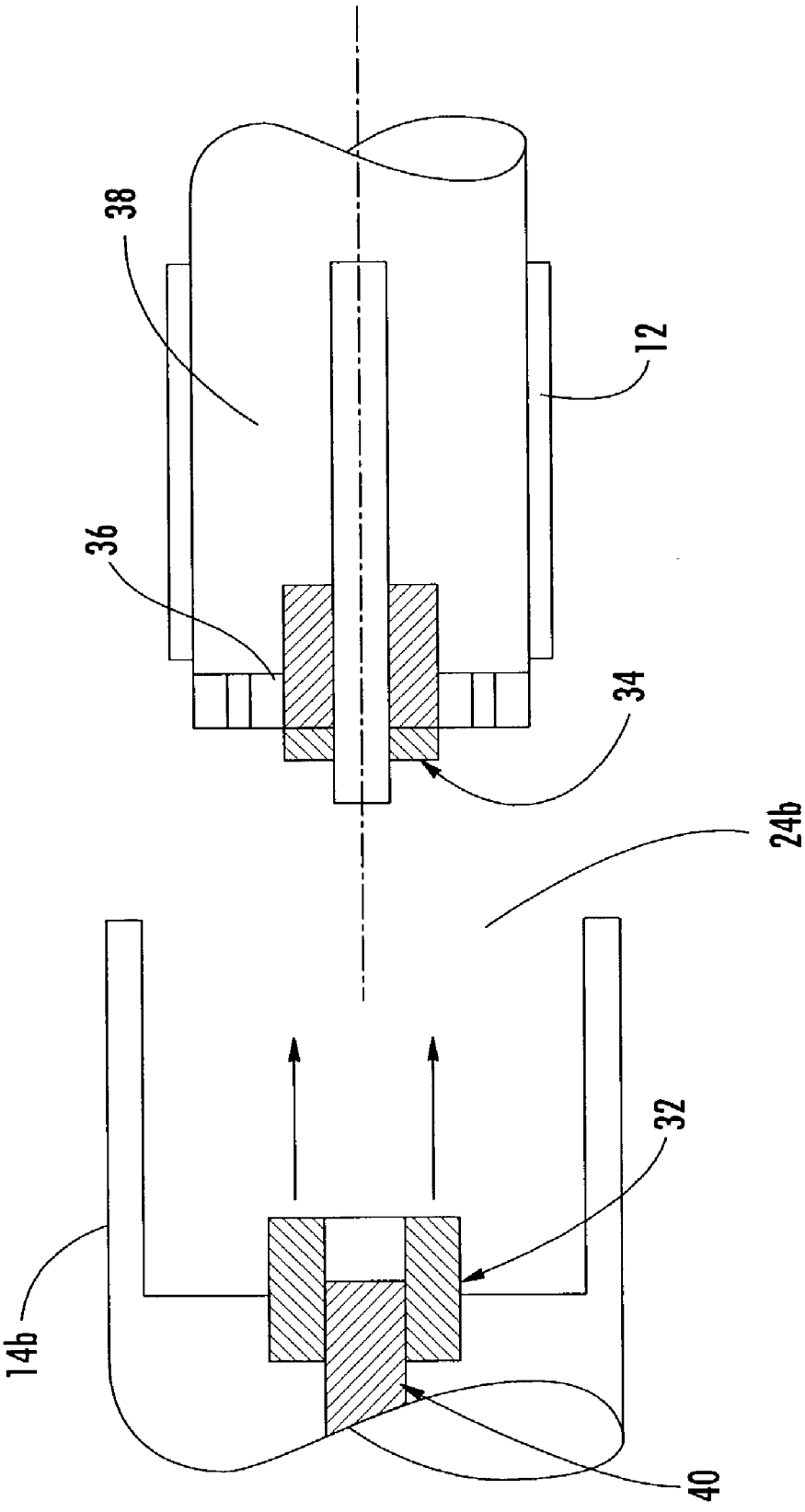


FIG. 7.

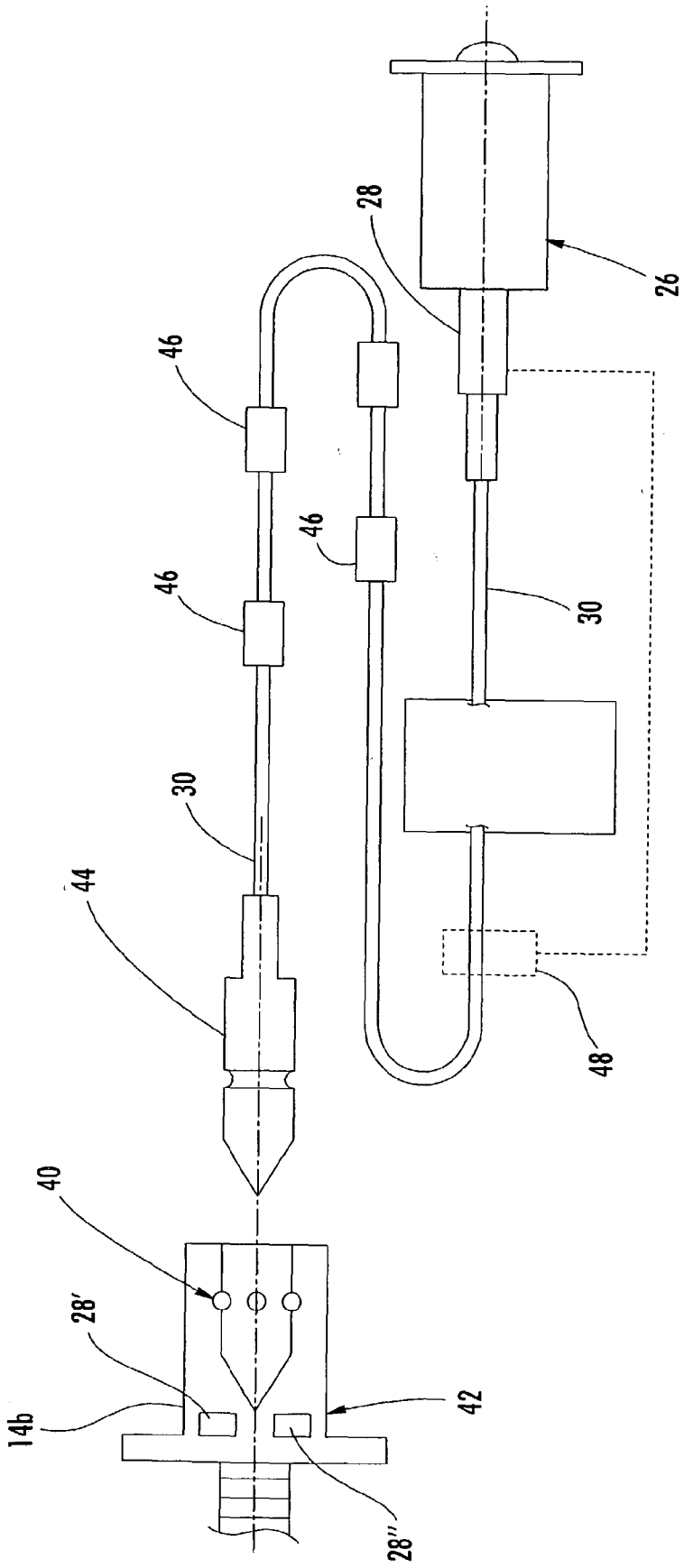


FIG. 8

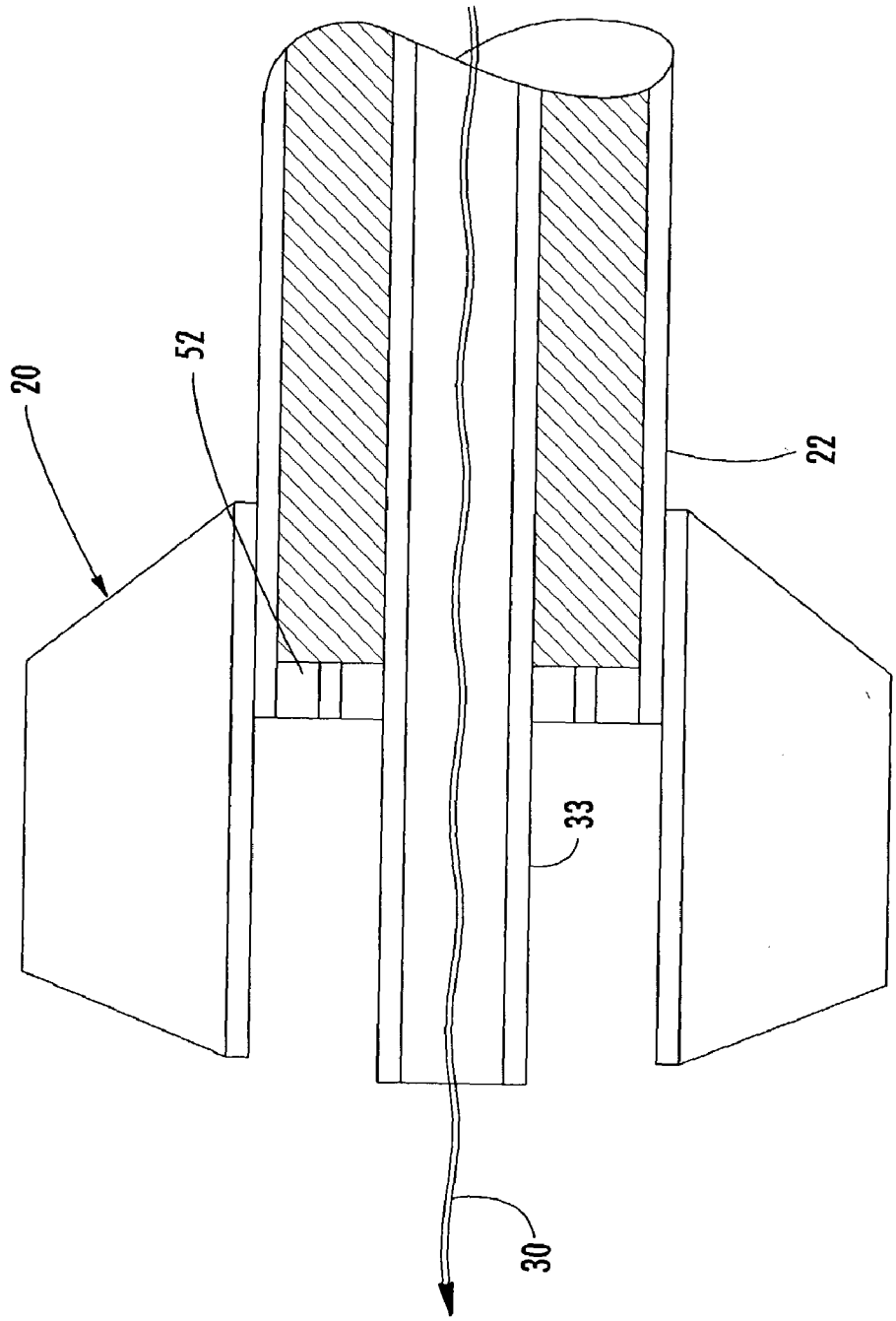


FIG. 9.

TACTICAL SURVEILLANCE SENSOR PROJECTILE SYSTEM

FIELD OF THE INVENTION

[0001] This invention relates to a tactical surveillance sensor projectile system, and more particularly to such a system which is portable, personal and can be used to see over and behind/beyond obstacles such as hills and buildings.

BACKGROUND OF THE INVENTION

[0002] A combatant or military foot soldier is often confronted with a hill or other obstacle and the uncertainty of conditions on the other side. Former methods of determining the military situation on the other side of a hill or nearby object included human observers, satellite observations, aircraft observations and an unmanned autonomous HMMWV.

[0003] The disadvantages of human observers are the exposure of the observer to harm and the revealing of his battlefield location. Moreover, the disadvantages of radio relay of information or radio communication data links include the requirement of line-of-sight connection, which results in the inability to communicate back over a hill. Additionally, radio communications are vulnerable to jamming and can also give away the location of the soldier.

[0004] The disadvantage of satellite and aircraft observations is the very long response time that often renders the information of little or minimal value to the soldier. The satellite and aircraft must be positioned over the observation area. The video data must be transmitted by low bandwidth radio links to a central station. Then, the video data must be transmitted to the soldier in some way, which involves location of autonomous Special Forces units, which takes additional time, if it is possible to do at all.

[0005] The disadvantage of the autonomous HMMWV is that it must travel over road-like terrain. Furthermore, the satellite up link of the video data can take an excessively long time. Further relay to a ground station and then back to the soldier results in a long delay time, and the HMMWV provides a significant battlefield signature, which is undesirable. Additionally, the use of satellite, aircraft and HMMWV observations involves high economic cost.

BRIEF SUMMARY OF THE INVENTION

[0006] It is therefore an object of this invention to provide an improved tactical surveillance projectile system.

[0007] It is a further object of this invention to provide an improved tactical surveillance projectile system which enables a combatant to see over a hill.

[0008] It is a further object of this invention to provide an improved tactical surveillance projectile system which is small, lightweight, and portable.

[0009] It is a further object of this invention to provide an improved tactical surveillance projectile system that can be easily launched and allows easy evaluation of the surveillance intelligence by a single soldier.

[0010] It is a further object of this invention to provide an improved tactical surveillance projectile system which is inexpensive, expendable and containable in an existing projectile housing such as an M127A1 flare housing.

[0011] It is a further object of this invention to provide an improved tactical surveillance projectile system which is rapidly deployable and provides rapid feedback of surveillance information.

[0012] It is a further object of this invention to provide an improved tactical surveillance projectile system that leaves no battlefield signature that would reveal the location of the launch site.

[0013] It is a further object of this invention to provide an improved tactical surveillance projectile system which is immune to countermeasures and cannot be "jammed".

[0014] The invention results from the realization that a truly personal, portable tactical surveillance system for over-the-hill surveillance which can be rapidly deployed and launched by a single individual and provide a very fast response is achieved with a projectile that is launched with a powered phase flight followed by a ballistic phase flight during which a sensor in the projectile senses ambient characteristics, such as images, biological or chemical agents, sound or radioactivity, and sends signals representative of those characteristics as an optical data stream over a fiber optic cable to a ground station.

[0015] This invention features a tactical surveillance sensor projectile system including a propellant and primer chamber, a firing device, a sensor device, a signal processor, and a fiber optic cable; the firing device fires the primer and propellant to establish a powered phase of flight followed by a ballistic phase of flight to clear an obstacle; the sensor device generates surveillance signals representative of ambient characteristics beyond the obstacle at least during the ballistic phase of flight; the signal processor is responsive to the sensor device for converting the signals representative of ambient conditions to an optical data stream; and the fiber optic cable delivers the optical data stream to a ground station at least during the ballistic phase of flight. The propellant and primer chamber, firing device, sensor device, and fiber optic cable may be housed in a standard projectile body such as a M127A1 flare.

[0016] In a preferred embodiment, a personal, portable launcher may be integral with the ground station or separate from the ground station. The launcher or ground station may include an integral passive connector for engaging the fiber optic cable with the launcher or ground station. The fiber optic cable may be fixedly connected to the signal processor at the proximate end and releasably interconnected with the launcher or ground station at the remote end for separating the fiber optic cable from the launcher or ground station. The fiber optic cable may disconnect from the launcher or ground station at a predetermined distance or when the entire length of fiber optic cable has been payed out. The tactical surveillance sensor projectile system may further include a spool for holding the fiber optic cable. A fiber optic cable payout tube may extend from the spool through the propellant and primer chamber to protect the fiber optic cable from combustion material. The launcher may further include a processor for determining azimuth and elevation data for angle of launch of the projectile and a processor for determining target coordinates. The sensor device may include a camera, such as a visible light camera that may

include a battery, an infrared camera, or the sensor device may be a radiation detector, an audio detector, a chemical/biological agent detector, or a temperature detector. There may be markers on the fiber optic cable and a second sensor device for generating a signal representative of the number of markers ejected, wherein the signal processor is responsive to the second sensor device for converting the marker signals to length of fiber optic cable payed out. The markers may be optically sensed, such as reflective markers, or the markers may be magnetic markers. The optical data stream generated by signal processor and representing ambient conditions may consist of a one-way flow of data from the signal processor to the ground station or launcher, and the one-way flow of data may be storable on a computer or on a computer disc.

[0017] This invention further features a tactical surveillance sensor projectile system including a chamber having propelling means and priming means; means for firing the means for priming and the means for propelling to establish a powered phase of flight followed by a ballistic phase of flight to clear an obstacle; means for generating surveillance signals representative of ambient characteristics beyond the obstacle at least during the ballistic phase of flight; means responsive to the means for generating surveillance signals for converting the signals representative of ambient conditions to an optical data stream; and means for delivering the optical data stream to a ground station at least during a ballistic phase of flight.

[0018] In a preferred embodiment, the tactical surveillance sensor projectile system further includes a personal portable launcher which may integral with the ground station or separate from the ground station. The launcher or ground station may include means for engaging the means for delivering the optical data stream with the launcher. The means for delivering the optical data stream may be fixedly connected to the means responsive to said sensor device at the proximate end and releasably interconnected with the launcher or the ground station at the remote end for separating the means for delivering the optical data stream from the launcher.

[0019] In one example, the chamber, the means for firing the primer and the propellant, the means for generating surveillance signals, and the means for delivering the optical data stream are housed in a standard existing projectile body. The projectile body may include a M127A1 flare. There may be means for holding the means for delivering the optical data stream, and there may be a means for protecting the means for delivering the optical data stream extending from the spool through the chamber to protect the means for delivering the optical data stream. The means for generating surveillance signals includes a camera, which may be a visible light camera or an infrared camera, and which may include a battery. The means for generating surveillance signals may include a radiation detector, an audio detector, a chemical/biological agent detector or a temperature detector. The means for delivering the optical data stream may disconnect from the launcher or the ground station at a predetermined distance. The means for delivering the optical data stream may disconnect from the launcher or ground station when the entirety of the means for delivering the optical data stream has been payed out.

[0020] There may be markers on the means for delivering the optical data stream and means for generating a signal representative of the number of markers ejected, wherein the means responsive to said means for generating surveillance signals responsive to the means for generating a signal representative of the number of markers ejected for converting said marker signals to amount of means for delivering the optical data stream payed out. The markers may be optically sensed markers, which may be reflective markers. The markers may be magnetic markers. The launcher may include means for determining azimuth and elevation data for angle of launch of the projectile, and may further include means for determining target coordinates. The optical data stream may consist of a one-way flow of data from the means responsive to the means for generating surveillance signals to the ground station, and the one-way flow of data may be storable on a computer or storable on a means for storing data at the ground station or launcher.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Other objects, features and advantages will occur to those skilled in the art from the following description of a preferred embodiment and the accompanying drawings, in which:

[0022] **FIG. 1** is a schematic view of a tactical surveillance sensor projectile system in accordance with the present invention with integral launcher and ground station;

[0023] **FIG. 2** is a schematic view of a tactical surveillance sensor projectile system in accordance with the present invention with separate launcher and ground station;

[0024] **FIG. 3** is a schematic view of a tactical surveillance sensor projectile system in accordance with the present invention in the stowed position;

[0025] **FIG. 4** is a view similar to **FIG. 3** of a tactical surveillance sensor projectile system in the deployed position;

[0026] **FIG. 5** is a schematic exploded view of a tactical surveillance sensor projectile system of **FIGS. 3 and 4**;

[0027] **FIG. 6** is a schematic cross-sectional view of a tactical surveillance sensor projectile system in accordance with the present invention;

[0028] **FIG. 7** is an enlarged schematic detailed view of a connection between the launcher and the projectile for a tactical surveillance sensor projectile system in accordance with the present invention;

[0029] **FIG. 8** is an enlarged schematic detailed view of an integral passive connector and fiber optic cable of a tactical surveillance sensor projectile system in accordance with the present invention; and

[0030] **FIG. 9** is an enlarged schematic view of the fiber optic cable payout tube when a tactical surveillance sensor projectile system of the present invention is in the deployed position.

DISCLOSURE OF THE PREFERRED EMBODIMENT

[0031] Aside from the preferred embodiment or embodiments disclosed below, this invention is capable of other embodiments and of being practiced or being carried out in various ways. Thus, it is to be understood that the invention is not limited in its application to the details of construction

and the arrangements of components set forth in the following description or illustrated in the drawings.

[0032] Tactical surveillance sensor projectile system **10**, **FIG. 1**, of this invention includes projectile **12**, a personal portable launcher **14** and ground station **16**. Launcher **14** may be integral with ground station **16**, as shown in **FIG. 1**, or separate from it, as shown in **FIG. 2**. In **FIG. 3**, projectile **12** is shown in the stowed position, including cap **18** and fins **20**. In **FIG. 4**, projectile **12** is shown in the deployed position, with cap **18** removed exposing sensor device **26**, and with fins **20** deployed.

[0033] Projectile **12** in accordance with the present invention, **FIGS. 5 and 6**, includes a chamber having means for propelling and means for priming, such as propellant and primer chamber **22** containing propellant **22***a* and primer **22***b*, and means for firing propellant **22***a* and primer **22***b* such as firing device **24** for firing primer **22***a* and propellant **22***b* and establishing a powered phase of flight of projectile **12** followed by a ballistic phase of flight to clear an obstacle such as a building or hill. Projectile **12** further includes means for generating surveillance signals representative of the ambient characteristics beyond the obstacle or hill at least during the ballistic phase of flight, such as sensor device **26**. Sensor device **26** may be a camera, such as a visible light camera or an infrared camera, or sensor device **26** may be a radiation detector, an audio sensor, a chemical/biological agent detector or a temperature detector. A battery or battery pack **27** may be included, in one example, to power a camera. Propellant and primer chamber **22**, firing device **24**, sensor device **26**, and fiber optic cable **30** can be housed in a standard existing projectile body **29**, which may be a standard M127A1 flare.

[0034] Projectile **12** also includes means responsive to sensor device **26** for converting the signals to optical data stream **35**, such as signal processor **28**, **FIGS. 5 and 6**. Means for delivering optical data stream **35** to ground station **16**, **16***a*, or launcher **14**, **14***a*, **FIGS. 1 and 2**, at least during the ballistic phase of flight, may include fiber optic cable **30** (shown unwound in **FIG. 5**). Means for holding fiberoptic cable **30**, such as spool or bobbin **31**, holds fiber optic cable **30**, which is wrapped around spool or bobbin **31**. Delivery of optical data stream **35** to ground station **16**, **16***a* or launcher **14**, **14***a* may take as little as six (6) seconds and may include, in one example, a picture of the military situation on the other side of a hill. Optical data stream **35** may consist of a one-way flow of data **37** from signal processor **28** through fiber optic cable **30** to ground station **16**, **16***a* or launcher **14**, **14***a* and the data may be storable on computer **15** or storing means such as computer disc **17**, at ground station **16**, **16***a*, **FIGS. 1 and 2**, to be analyzed at a later time.

[0035] In one embodiment, tactical surveillance projectile system **10** includes launcher **14***b*, **FIG. 7**, with firing device **24***b* including striker **32** and firing pin **34** for firing primer **36** and propellant **38**. To launch projectile **12**, the soldier or operator uses the same technique used to launch a standard flare such as the existing M127A1 flare, or a rifle grenade launcher, whereby a sharp force is applied to at least one of projectile **12** and launcher **14**, causing striker **32** and firing pin **24** to strike one another, thus firing primer **36** and propellant **38**. Launcher **14***b* further includes means for engaging fiber optic cable **30** with launcher **14***b* or ground station **16**, **16***a*, such as integral passive connector **40**, **FIG. 5**.

[0036] Fiber optic cable **30**, **FIG. 8** is fixedly connected to signal processor **28** at the proximate end and releasably interconnected with launcher **14***b* at the remote end for separating fiber optic cable **30** from launcher **14***b* or the ground station. In one example, integral passive connector **40** may be a readily available bayonet fiber optic connector. Integral passive connector **40** may include female connector **42** on launcher **14** or ground station **16**, and male connector **44** on fiber optic cable **30**. Thus, during launch preparation, male connector **44** attaches to female connector **42**. Thereafter, fiber optic cable **30** may disconnect from launcher **14** or ground station **16** at integral passive connector **40** when male connector **44** disengages from female connector **42** at a predetermined distance, or when the entire length of fiber optic cable **30** has been payed out through fiber optic payout tube **33**, **FIGS. 5 and 6**, or if fiber optic cable **30** breaks due to some battlefield condition. Consequently, no battlefield signature is left that would reveal the location of the launch site or ground station.

[0037] When projectile **12** is deployed, protecting means for protecting fiber optic cable **30** from the heat, exhaust and combustion products of projectile **12**, such as fiber optic payout tube **33**, extends from propellant and primer chamber **22** and beyond nozzle plate **52**, **FIG. 9**. It has been determined that a 240 micron optical fiber accommodating a one-half mile range can be wound in an annulus within the M127A1 flare envelope. Other diameters and lengths of fiber optic cable may be employed with the present invention.

[0038] Fiber optic cable **30** may include markers **46**, **FIG. 8** which may be optically sensed, such as reflective markers, or markers **46** may be magnetic. System **10** may further include a means for generating signals representative of the number of markers **46** ejected, such as second sensor device **48**, wherein signal processor **28** is responsive to second sensor device **48** for converting the marker signals to amount or length of fiber optic cable **30** payed out. Thus, the range of an obstacle, target or enemy may be determined.

[0039] Preferably, launcher **14** includes means for determining azimuth and elevation data for an angle of launch of projectile **12**, such as processor **28'**, **FIG. 8** and may include means for determining target coordinates, such as a processor **28"**. Launcher azimuth and elevation data sensors, which may include a compass and inclinometer, are generally available, and target coordinate determining software is relatively easily written or available and used, for instance, by the commercial firearms industry.

[0040] The subject invention thus results in a tactical surveillance sensor projectile system that is personal and portable, and capable of rapid deployment over hills or obstacles to provide information rapidly and that may be contained in an existing projectile housing, making it safer and less expensive than previous approaches.

[0041] Although specific features of the invention are shown in some drawings and not in others, this is for convenience only as each feature may be combined with any or all of the other features in accordance with the invention. The words "including", "comprising", "having", and "with"

as used herein are to be interpreted broadly and comprehensively and are not limited to any physical interconnection. Moreover, any embodiments disclosed in the subject application are not to be taken as the only possible embodiments.

[0042] Other embodiments will occur to those skilled in the art and are within the following claims:

What is claimed is:

1. A tactical surveillance sensor projectile system comprising:

a propellant and primer chamber;

a firing device for firing said primer and said propellant to establish a powered phase of flight followed by a ballistic phase of flight to clear an obstacle;

a sensor device for generating surveillance signals representative of ambient characteristics beyond the obstacle at least during the ballistic phase of flight;

a signal processor responsive to said sensor device for converting said signals representative of ambient conditions to an optical data stream; and

a fiber optic cable for delivering said optical data stream to a ground station at least during a ballistic phase of flight.

2. The tactical surveillance sensor projectile system of claim 1 further including a personal portable launcher.

3. The tactical surveillance sensor projectile system of claim 2 wherein the launcher is integral with the ground station.

4. The tactical surveillance sensor projectile system of claim 2 in which said launcher includes an integral passive connector for engaging said fiber optic cable with the launcher.

5. The tactical surveillance sensor projectile system of claim 3 in which said ground station includes an integral passive connector for engaging said fiber optic cable with the ground station.

6. The tactical surveillance sensor projectile system of claim 2 in which said fiber optic cable is fixedly connected to said signal processor at the proximate end and releasably interconnected with the launcher at the remote end for separating the fiber optic cable from the launcher.

7. The tactical surveillance sensor projectile system of claim 3 in which said fiber optic able is fixedly connected to said signal processor at the proximate end and releasably connected with the ground station at the remote end for separating the fiber optic cable from the ground station.

8. The tactical surveillance sensor projectile system of claim 1 in which said propellant and primer chamber, firing device, sensor device, and fiber optic cable are housed in a standard existing projectile body.

9. The tactical surveillance sensor projectile system of claim 8 in which said projectile body includes a M127A1 flare.

10. The tactical surveillance sensor projectile system of claim 1 further including a spool for holding the fiber optic cable.

11. The tactical surveillance sensor projectile system of claim 10 further including a fiber optic cable payout tube extending from the spool through the propellant and primer chamber.

12. The tactical surveillance sensor projectile system of claim 1 in which the sensor device includes a camera.

13. The tactical surveillance sensor projectile system of claim 12 in which the camera is a visible light camera.

14. The tactical surveillance sensor projectile system of claim 12 in which the camera is an infrared camera.

15. The tactical surveillance sensor projectile system of claim 12 further including a battery.

16. The tactical surveillance sensor projectile system of claim 1 in which the sensor device includes a radiation detector.

17. The tactical surveillance sensor projectile system of claim 1 in which the sensor device includes an audio detector.

18. The tactical surveillance sensor projectile system of claim 1 in which the sensor device includes a chemical/biological agent detector.

19. The tactical surveillance sensor projectile system of claim 1 in which the sensor device includes a temperature detector.

20. The tactical surveillance sensor projectile system of claim 4 wherein the fiber optic cable disconnects from the launcher at a predetermined distance.

21. The tactical surveillance sensor projectile system of claim 5 wherein the fiber optic cable disconnects from the ground station at a predetermined distance.

22. The tactical surveillance sensor projectile system of claim 4 wherein the fiber optic cable disconnects from the launcher when the entire length of fiber optic cable has been payed out.

23. The tactical surveillance sensor projectile system of claim 5 wherein the fiber optic cable disconnects from the ground station when the entire length of fiber optic cable has been payed out.

24. The tactical surveillance sensor projectile system of claim 1 further including markers on said fiber optic cable and a second sensor device for generating a signal representative of the number of markers ejected wherein said signal processor is responsive to the second sensor device for converting said marker signals to length of fiber optic cable payed out.

25. The tactical surveillance sensor projectile system of claim 24 wherein the markers are optically sensed markers.

26. The tactical surveillance sensor projectile system of claim 25 wherein the optically sensed markers are reflective markers.

27. The tactical surveillance sensor projectile system of claim 24 wherein the markers are magnetic markers.

28. The tactical surveillance sensor projectile system of claim 2 wherein the launcher includes a processor for determining azimuth and elevation data for angle of launch of the projectile.

29. The tactical surveillance sensor projectile system of claim 2 wherein the launcher includes a processor for determining target coordinates.

30. The tactical surveillance sensor projectile system of claim 1 wherein the optical data stream consists of a one-way flow of data from the signal processor to the ground station.

31. The tactical surveillance sensor projectile system of claim 30 in which the one-way flow of data is storable on a computer.

32. The tactical surveillance sensor projectile system of claim 30 in which the one-way flow of data is storable on a computer disc.

33. A tactical surveillance sensor projectile system comprising:

a propellant and primer chamber;

a firing device for firing said primer and said propellant to establish a powered phase of flight followed by a ballistic phase of flight to clear an obstacle;

a sensor device for generating surveillance signals representative of ambient characteristics beyond the obstacle at least during the ballistic phase of flight;

a signal processor responsive to said sensor device for converting said signals representative of ambient conditions to an optical data stream;

a fiber optic cable for delivering said optical data stream to a ground station at least during a ballistic phase of flight; and

a personal portable launcher.

34. A tactical surveillance sensor projectile system comprising:

a propellant and primer chamber;

a firing device for firing said primer and said propellant to establish a powered phase of flight followed by a ballistic phase of flight to clear an obstacle;

a sensor device for generating surveillance signals representative of ambient characteristics beyond the obstacle at least during the ballistic phase of flight;

a signal processor responsive to said sensor device for converting said signals representative of ambient conditions to an optical data stream; and

a fiber optic cable for delivering said optical data stream to a ground station at least during a ballistic phase of flight,

wherein the propellant and primer chamber, firing device, sensor device, and fiber optic cable are housed in a standard existing projectile body.

35. A tactical surveillance sensor projectile system comprising:

a propellant and primer chamber;

a firing device for firing said primer and said propellant to establish a powered phase of flight followed by a ballistic phase of flight to clear an obstacle;

a sensor device for generating surveillance signals representative of ambient characteristics beyond the obstacle at least during the ballistic phase of flight;

a signal processor responsive to said sensor device for converting said signals representative of ambient conditions to an optical data stream;

a fiber optic cable for delivering said optical data stream to a ground station at least during a ballistic phase of flight; and

a fiber optic cable payout tube extending from the spool through the propellant and primer chamber.

36. A tactical surveillance sensor projectile system comprising:

a propellant and primer chamber;

a firing device for firing said primer and said propellant to establish a powered phase of flight followed by a ballistic phase of flight to clear an obstacle;

a sensor device for generating surveillance signals representative of ambient characteristics beyond the obstacle at least during the ballistic phase of flight;

a signal processor responsive to said sensor device for converting said signals representative of ambient conditions to an optical data stream; and

a fiber optic cable for delivering said optical data stream to a ground station at least during a ballistic phase of flight,

wherein the optical data stream consists of a one-way flow of data from the signal processor to the ground station.

37. A tactical surveillance sensor projectile system comprising:

a chamber including means for propelling and means for priming;

means for firing said means for priming and said means for propelling to establish a powered phase of flight followed by a ballistic phase of flight to clear an obstacle;

means for generating surveillance signals representative of ambient characteristics beyond the obstacle at least during the ballistic phase of flight;

means responsive to said means for generating surveillance signals for converting said signals representative of ambient conditions to an optical data stream; and

means for delivering said optical data stream to a ground station at least during a ballistic phase of flight.

38. The tactical surveillance sensor projectile system of claim 37 further including a personal portable launcher.

39. The tactical surveillance sensor projectile system of claim 38 wherein the launcher is integral with the ground station.

40. The tactical surveillance sensor projectile system of claim 38 in which said launcher includes means for engaging said means for delivering said optical data stream with the launcher.

41. The tactical surveillance sensor projectile system of claim 39 in which said ground station includes means for engaging said means for delivering said optical data stream with the ground station.

42. The tactical surveillance sensor projectile system of claim 38 in which said means for delivering said optical data stream is fixedly connected to said means responsive to said sensor device at the proximate end and releasably interconnected with the launcher at the remote end for separating the means for delivering said optical data stream from the launcher.

43. The tactical surveillance sensor projectile system of claim 39 in which said means for delivering said optical data stream is fixedly connected to said means responsive to said sensor device at the proximate end and releasably connected

with the ground station at the remote end for separating the means for delivering said optical data stream from the ground station.

44. The tactical surveillance sensor projectile system of claim 37 in which said chamber, said means for firing said primer and said propellant, said means for generating surveillance signals, and said means for delivering said optical data stream are housed in a standard existing projectile body.

45. The tactical surveillance sensor projectile system of claim 44 in which said projectile body includes a M127A1 flare.

46. The tactical surveillance sensor projectile system of claim 37 further including a means for holding the means for delivering said optical data stream.

47. The tactical surveillance sensor projectile system of claim 37 further including protecting means extending from the spool through the chamber to protect the means for delivering said optical data stream.

48. The tactical surveillance sensor projectile system of claim 37 in which the means for generating surveillance signals includes a camera.

49. The tactical surveillance sensor projectile system of claim 48 in which the camera is a visible light camera.

50. The tactical surveillance sensor projectile system of claim 48 in which the camera is an infrared camera.

51. The tactical surveillance sensor projectile system of claim 48 further including a battery.

52. The tactical surveillance sensor projectile system of claim 37 in which the means for generating surveillance signals includes a radiation detector.

53. The tactical surveillance sensor projectile system of claim 37 in which the means for generating surveillance signals includes an audio detector.

54. The tactical surveillance sensor projectile system of claim 37 in which the means for generating surveillance signals includes a chemical/biological agent detector.

55. The tactical surveillance sensor projectile system of claim 37 in which the means for generating surveillance signals includes a temperature detector.

56. The tactical surveillance sensor projectile system of claim 40 wherein the means for delivering the optical data stream disconnects from the launcher at a predetermined distance.

57. The tactical surveillance sensor projectile system of claim 41 wherein the means for delivering the optical data stream disconnects from the ground station at a predetermined distance.

58. The tactical surveillance sensor projectile system of claim 40 wherein the means for delivering the optical data stream disconnects from the launcher when the entirety of the means for delivering the optical data stream has been payed out.

59. The tactical surveillance sensor projectile system of claim 41 wherein the means for delivering the optical data stream disconnects from the ground station when the entirety of the means for delivering the optical data stream has been payed out.

60. The tactical surveillance sensor projectile system of claim 37 further including markers on said means for delivering said optical data and means for generating a signal representative of the number of markers ejected wherein said means responsive to said means for generating surveillance signals responsive to the means for generating a signal representative of the number of markers ejected for converting said marker signals to amount of means for delivering the optical data stream payed out.

61. The tactical surveillance sensor projectile system of claim 60 wherein the markers are optically sensed markers.

62. The tactical surveillance sensor projectile system of claim 61 wherein the optically sensed markers are reflective markers.

63. The tactical surveillance sensor projectile system of claim 60 wherein the markers are magnetic markers.

64. The tactical surveillance sensor projectile system of claim 38 wherein the launcher includes means for determining azimuth and elevation data for angle of launch of the projectile.

65. The tactical surveillance sensor projectile system of claim 38 wherein the launcher includes means for determining target coordinates.

66. The tactical surveillance sensor projectile system of claim 37 wherein the optical data stream consists of a one-way flow of data from the means responsive to said means for generating surveillance signals to the ground station.

67. The tactical surveillance sensor projectile system of claim 66 in which the one-way flow of data is storable on a computer.

68. The tactical surveillance sensor projectile system of claim 66 in which the one-way flow of data is storable on a means for storing data.

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